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RIO BLANCO OIL SHALE PROJECT

PROGRESS REPORT 7

GEOTECHNICAL DATA GATHERING PROJECT

GEOLOGIC PROGRAM

SECTION 1.1

GULF OIL CORPORATION
AND
STANDARD OIL COMPANY (INDIANA)

1.0 GEOTECHNICAL DATA GATHERING PROJECT

The geologic and hydrologic programs which make up the Geotechnical Data Gathering Project were initiated in the spring and summer of 1974. Both the geologic program and the hydrologic program are composites of a number of tasks as shown by the work breakdown structure, Figure 1.0-1. Nearly all of the tasks under both of the programs have been completed prior to this reporting period. Therefore, the Geotechnical Data Gathering Project portion of this progress report has been structured to include only the significant activities occurring during this quarterly reporting period.

Table 1.0-1 is an index in which significant activities related to the tasks and subtasks for each of the two programs are presented in previous progress report(s).

Activities occurring under the geologic program during the quarterly reporting period involved: (1) revision of the tract stratigraphic correlation network and zonal resource maps based on new assay data in three coreholes, G-S 2-3, 4-5, and 6; and (2) transmitting 1116 feet of split core from corehole G-S 7 to the USGS for quantitative trace element analyses.

Activities conducted under the hydrologic program were limited to the revised baseline monitoring program that has been approved by the AOSS. The revised program consists of: collection and analyses of monthly samples from stream gaging stations; continuous monitoring of flow rate, sediment discharge, temperature, and specific conductance at the stream gaging stations; monthly monitoring and recording water levels in alluvial holes; collection of water samples during the months of November, February, April, May, June, July, August, and September from the alluvial monitoring holes; collection of water samples, semi-annually, from the deep aquifer monitor holes; and measuring water levels monthly from the deep aquifer monitor holes. The last semi-annual water sampling period for the deep aquifers was March, 1976 and therefore will be reported in this progress report.

Figure 1.0-1

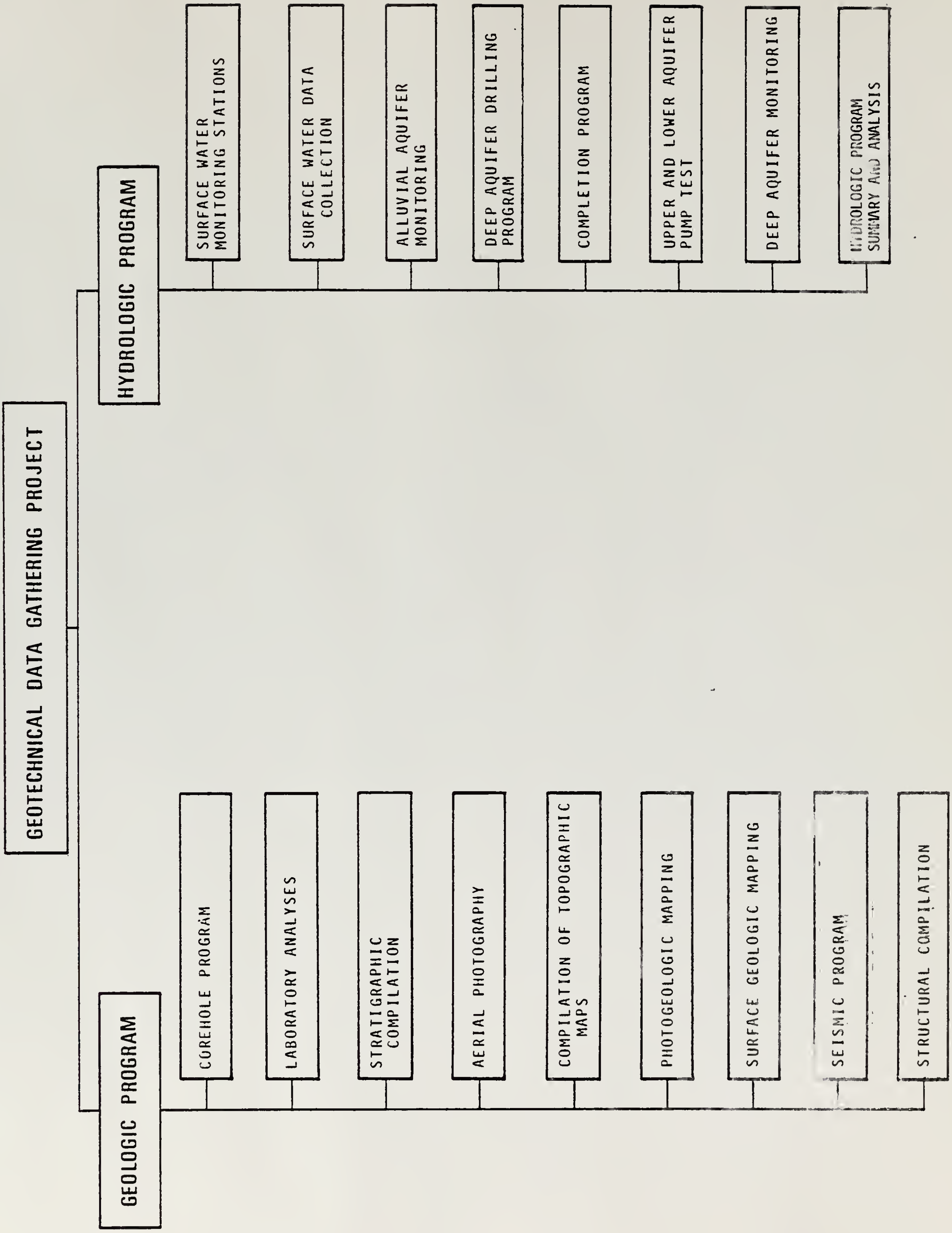
GEOTECHNICAL DATA GATHERING PROJECT
GEOLOGIC PROGRAM
COREHOLE PROGRAM
LABORATORY ANALYSES
STRATIGRAPHIC COMPILATION
AERIAL PHOTOGRAPHY
COMPILATION OF TOPOGRAPHIC MAPS
PHOTOGEOLOGIC MAPPING
SURFACE GEOLOGIC MAPPING
SEISMIC PROGRAM
STRUCTURAL COMPILATION
HYDROLOGIC PROGRAM
SURFACE WATER MONITORING STATIONS
SURFACE WATER DATA COLLECTION
ALLUVIAL AQUIFER MONITORING
DEEP AQUIFER DRILLING PROGRAM
COMPLETION PROGRAM
UPPER AND LOWER AQUIFER PUMP TEST
DEEP AQUIFER MONITORING
HYDROLOGIC PROGRAM SUMMARY AND ANALYSIS

Table 1.0-1

INDEX OF TASKS REPORTED IN PREVIOUS PROGRESS REPORTS

	Task	Progress Report(s)
1.1	Geologic Program	
1.1.1	Corehole Program	2
1.1.2	Laboratory Analyses	2,3,4,5,6
1.1.2.1	Oil Shale Assays	2,3,4,5,6
1.1.2.2	Nahcolite	2
1.1.2.3	Extractable Alumina	2
1.1.2.4	Trace Elements	2,3
1.1.2.5	Gas Samples	2
1.1.2.6	Rock Mechanics	2,5
1.1.3	Stratigraphic Compilation	3,4,5
1.1.4	Aerial Photography	2,4,5,6
1.1.5	Compilation of Topographic Mapping	2,4,5,6
1.1.6	Photogeologic Mapping	2
1.1.7	Surface Geologic Mapping	2
1.1.8	Seismic Program	2
1.1.9	Structural Compilation	2,5
1.2	Hydrologic Program	
1.2.1	Surface Water Monitoring Stations	2,3,4,5,6
1.2.2	Surface Water Data Collection	2,3,4,5,6
1.2.3	Alluvial Aquifers	2,3,4,5,6
1.2.4	Deep Aquifer Drilling Program	2,4,5
1.2.5	Deep Aquifer Completion	2,4
1.2.6	Upper and Lower Aquifer Pumping Tests	3,4
1.2.7	Deep Aquifer Monitoring	2,3,4,5,6
1.2.8	Hydrologic Program Summary and Analysis	4,5,6

1.1 Geologic Program

The activities occurring under the geologic program during the quarterly reporting period involved: (1) revision of tract stratigraphic correlations and zonal resource maps based on new assay data; and (2) transmittal of 1116 feet of core split to the USGS for quantitative analysis of nine trace elements. Other tasks for the most part have been completed. Table 1.0-1, page 1.0-3, is an index showing in which previous progress reports results of these tasks have been presented.

Revision of tract stratigraphic correlations and zonal resource maps was required when new Fischer assay data were obtained of core samples from the Gulf-Standard (Indiana) corehole program. The new assay data is a result of earlier check-assaying of 45 samples from coreholes G-S 4-5 and G-S 6 which indicated that the entire stratigraphic interval from the R-2 zone through the R-5 zone required reassaying in each of the holes. In addition to these reassays, short core intervals from holes G-S 2-3, and 6 which had been initially withheld from Fischer assay for rock mechanics testing were released for assay and the assays completed. This combination of new assay data constituted the basis for the geologic revisions.

The new assay dated resulted in slight revision of zonal boundaries in the northeast part of Tract C-a. It also caused zonal resource map changes in the same general area. Although some zonal oil shale grades changed significantly, the overall resources of the tract were only slightly affected because some zonal grade changes increased while others decreased, thereby compensating for one another.

Appropriate revisions were made to the tract correlation network which consists of density log cross sections and oil shale grade histogram log cross sections. Revised cross sections have been submitted to the AOSS.

A 1,116 foot core split from corehole G-S 7 was submitted to the USGS for quantitative analysis of nine specific trace elements. The nine trace elements are vanadium and molybdenum together with the following seven trace elements which were included in the original Rio Blanco analyses program: antimony, arsenic, boron, cadmium, fluoride, mercury and selenium. For the purpose of direct comparison between the results, the USGS analyses will be conducted on composite core intervals identical to those Rio Blanco had analyzed. The USGS will furnish representative and sufficient sized splits of the composite samples to Rio Blanco in the event that Rio Blanco should decide to run additional check- analyses on the composite splits. Additional checking, if done, may resolve variations in analysis results due to sample preparation, sample contamination, difference in lab procedures, etc. At the end of this quarterly reporting period (May 31, 1976) trace element by the USGS were not completed. Results will be reported in future progress reports as they are obtained.

1.2 Hydrology

Rio Blanco
Oil Shale Project
PROGRESS REPORT 7

GEOTECHNICAL DATA GATHERING PROJECT

HYDROLOGIC PROGRAM
SECTION 1.2
INTERPRETIVE TEXT

To Area Oil Shale Supervisor
United States Geological Survey

by
Wright Water Engineers
for
Gulf Oil Corporation
and
Standard Oil Company (Indiana)

PROGRESS REPORT 7

MARCH, APRIL, MAY, 1976

GEOTECHNICAL DATA GATHERING PROJECT
HYDROLOGIC PROGRAM
SECTION 1.2

INTERPRETIVE TEXT
JUNE 30, 1976

To
AREA OIL SHALE SUPERVISOR
UNITED STATES GEOLOGICAL SURVEY

By
WRIGHT WATER ENGINEERS, INC.
For
GULF OIL CORPORATION
And
STANDARD OIL COMPANY (INDIANA)

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INTERPRETIVE TEXT

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1.2-11	Summary Water Analysis-Stream Gaging Station U.S.G.S. 09306246-Tributary to Yellow Creek east of 84 Mesa; Year 1976	18
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INDEX OF DATA FOR RIO BLANCO OIL SHALE PROGRESS REPORTS 2-7
HYDROLOGIC PROGRAM, SECTION 1.2
SURFACE WATER DATA COLLECTION PROGRAM [1]

	Discharge		Water Quality		Precipitation		
Station	Instantaneous	Continuous	Data	Summary	Recording	Storage	Intensity
Box Elder Gulch near west line Tract C-a	R2, R3V1, R4	R5, R6, R7	R3V1 R7V	R4, R5, R6, R7		R4, R4V, R5, R5V R6, R6V, R7, R7V	
Dry Fork near west line Tract C-a						R4, R4V, R5, R5V, R6, R6V, R7, R7V	
Corral Gulch near West line Tract C-a	R2, R3, R3V1, R4	R5, R6, R7	R3V1, R6V R7V	R3, R4, R5 R6, R7		R4, R4V, R5, R5V R6, R6V, R7, R7V	
Corral Gulch east or Tract C-a	R3, R3V1, R4	R5, R6, R7	R3V1, R6V R7V	R3, R4, R5, R6, R7			
Coral Gulch South of 84 Meas.	R5, R6	R7	R6V, R7V	R5, R6, R7			
Stake Spring Draw near Confluence with Corral Gulch		R7	R7V	R7	R3, R3V1, R4 R4V, R5, R5V R6, R6V, R7, R7V		R5V, R6V
Yellow Creek near White River, [illegible]	R2, R3, R3V1 R4,	R5, R6, R7	R6V, R7V	R5, R6, R7	R3, R3v, R4 R4V, R5, R5V R6, R6V, R7, R7V		R5V, R6V
Corral Gulch near Cathedral Bluffs					R3, R3v1, R4 R4V, R5, R5V, R7, R7V		R5V, R6V
Tributary to Yellow Creek east of 84 Mesa		R7	R7V	R7			
"Rinky Dink" Gulch near east line Tract C-a		R7	R7V	R7			
Upper Big Duck Creek north of 84 Mesa		R7	R7V	R7			
Lower Big Duck Creek north of 84 Mesa		R7	R7V	R7			

1. LEGEND: Applies to Alluvial Aquifer Data & Deep Aquifer Data Program.

R: RBOSP Progress Report, Hydrologic Program

V: RBOSP Hydrologic Program Raw Data Volume

A: RBOSP Progress Report, Hydrologic Program, Interpretive Text Appendix

e.g.: R3V1 RBOSP Progress Report 3, Hydrologic Program, Raw Data Volume 1.

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FOR RIO BLANCO OIL SHALE PROGRESS REPORTS 2-7
HYDROLOGIC PROGRAM SECTION 1.2
ALLUVIAL AQUIFER DATA

Test Hole	Drilling	Water Level	Water Quality: Field Data pH, Cond., Temp.	Water Quality: Lab. Analysis	Summary
S-6*					
S-7	R2A	R3, R4, R5, R6, R7	R3, R4, R5, R6, R7	R3VI, R4V, R5V, R6V, R7V	R3, R4, R5, R6, R7
S-8	R2A	R3, R4, R5, R6, R7	R3, R4, R5, R6, R7	R3VI, R4V, R5V, R6V, R7V	R3, R4, R5, R6, R7
S-11	R2A	R3, R4, R5, R6, R7	R3, R4, R5, R6, R7	R3VI, R4V, R5V, R6V, R7V	R3, R4, R5, R6, R7
S-12	R2A	R3, R4, R5, R6, R7	R3, R4, R5, R6, R7	R3VI, R4V, R5V, R6V, R7V	R3, R4, P5, R6, R7
S-13*	R2A				
S-14*	R3A				
S-15	R3A				
S-16*	R4A				
S-17	R4A				
S-18*	R4A				
S-19	R4A	R4, R5, R6, R7	R4, R5, R6, R7	R4V, R5V, R6V, R7V	R4, R5, R6, R7
S-22	R4A	R4, R5, R6, R7	R4, R5, R6, R7	R4V, R5V, R6V, R7V	RR4, R5, R6, R7
S-23	R4A	R4, R5, R6, R7	R4, R5, R6, R7	R4V, R5V, R6V, R7V	R4, R5, P6, R7
S-24	R4A	R4, R5, R6, R7	R4, R5, R6, R7	R4V, R5V, R6V, R7V	R4, R5, R6, R7

* The test holes that are not referenced are dry: See Text R3, R4, R5, R6, and R7.

INDEX OF DATA FOR RIO BLANCO OIL SHALE PROGRESS REPORTS 2-7
HYDROLOGIC PROGRAM, SECTION 1.2

DEEP AQUIFER PROGRAM DATA

	COMPLETIONS		GEOHYDROLOGIC DATA				
			AQUIFER		DRILLING		
					Geophysical		
TEST HOLE	Test Hole Cross Sections	Pump Installations	Hydrologic Cross Section	Aquifer Thickness Maps	Water Velocity, Water Movement & Temp. vs. Depth	Water Production	Informal Recovery Tests
AM-2A	R2A		R2	R4			
AM-3	R2A		R2	R4			
AM-4	R2A		R2	R4			
CE-701	R2A	R3	R2	R4			
CE-702	R2A		R2	R4			
CE-703	R2A			R4			
CE-705A	R2A	R3	R2	R4			
CE-707	R2A		R2	R4			
CE-708	R2A		R3	R4			
CE-709	R2A		R3	R4			
G-S 1	R2A		R2	R4	R2A	R2A	R2A
G-S 2-3	R2A		R2	R4	R2A	R2A	R2A
G-S 4-5	R2A	R3	R2	R4	R2A	R2A	R2A
G-S 6	R2A		R2	R4	R2A	R2A	R2A
G-S 7	R2A		R2	R4	R2A	R2A	R2A
G-S 8	R2A		R2	R4	R2A	R2A	R2A
G-S 9	R2A		R2	R4	R2A	R2A	R2A
G-S 10	R2A		R2	R4	R2A	R2A	R2A
G-S 11	R2A		R2	R4	R2A	R2A	R2A
G-S 12	R2A	R3	R2	R4	R2A	R2A	R2A
G-S 13	R2A		R2	R4	R2A	R2A	R2A
G-S 14	R2A		R2	R4	R2A	R2A	R2A
G-S 15	R2A		R2	R4	R2A	R2A	R2A
G-S D16	R2A	R3	R2	R4		R2A	
G-S D17	R2A	R3	R2	R4		R2A	
G-S D18	R2A	R3	R2	R4		R2A	
G-S D19	R2A	R3	R2	R4		R2A	
G-S M1	R2A		R2	R4	R2A	R2A	R2A
G-S M2	R2A				R2A	R2A	R2A
G-S M3	R2A				R2A	R2A	R2A
G-S M4	R2A				R2A	R2A	R2A
G-S M5	R4					R4	
TO 1	R2A		R2	R4			
TO 2	R2A		R2	R4			
TO	R2A		R2	R			

INDEX OF DATA FOR RIO BLANCO OIL SHALE PROGRESS REPORTS 2-7
HYDROLOGIC PROGRAM, SECTION 1.2

DEEP AQUIFER PROGRAM DATA

	GEOHYDROLOGIC DATA						
	PUMPING TESTS				MONITORING PROGRAM		
TEST HOLE	WATER LEVEL DRAWDOWN DATA	SEMI-LOG DRAWDOWN PLOTS	TRANSMISSIVITY AND STORAGE COEF.	TRANSMISSIVITY AND PERMEABILITY MAPS	WATER LEVELS	HYDROGRAPHS	PIEZOMETRIC SURFACE MAPS
AM-2A	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
AM-3	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
AM-4							
CE-701	R3V3	R3A			R3V2	R3A,R4A	R4,R5,R6,R7
CE-702	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
CE-703							
CE-705A	R3V3	R3A	R3	R4	R3V2	R3A,	R4,R5,R6,R7
CE-707	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
CE-708	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
CE-709	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 1	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 2-3	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 4-5	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 6	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 7							
G-S 8	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 9	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 10	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 11	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 12	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 13	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S 14							
G-S 15	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S D16	R3V3	R3A	R3	R4	R3V2	R3A	R4
G-S D17	R3V3	R3A	R3	R4	R3V2	R3A	R4
G-S D18	R3V3	R3A	R3	R4	R3V2	R3A	R4
G-S D19	R3V3	R3A	R3	R4	R3V2	R3A	R4
G-S M1	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
G-S M2	R3V3	R3A	R3		R3V2	R3A,R4A	
G-S M3	R3V3	R3A	R3		R3V2	R3A,R4A	
G-S M4	R3V3	R3A	R3		R3V2	R3A,R4A	
G-S M5							
TO 1	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
TO 2	R3V3	R3A	R3	R4	R3V2	R3A,R4A	R4,R5,R6,R7
TO 3	R3V3	R3A	R3	R4	R3V2	R3A	R4

INDEX OF DATA FOR RIO BLANCO OIL SHALE PROGRESS REPORTS 2-7
HYDROLOGIC PROGRAM, SECTION 1.2

DEEP AQUIFER PROGRAM DATA

WATER QUALITY

	DRILLING		PUMPING TEST		MONITORING		
TEST HOLE	FIELD ANALYSIS COND., pH, TEMP.	LAB ANAYLSIS	FIELD ANALYSIS COND.,pH, TEMP.	LAB ANALYSIS	LAB ANALYSIS	SUMMARY OF LAB ANALYSIS	CHEMICAL CONSISTENT DISTRIBUTION MAPS
AM-2A		R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
AM-3		R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
AM-4		R3V1					R4;R4V
CE-701		R3V1				R3,R4,R5,R7	R4;R4V
CE-702		R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
CE-703		R3V1				R3,R4,R5,R7	R4;R4V
CE-705A		R3V1	R3	R3V1		R3,R4,R5,R7	R4;R4V
CE-707		R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
CE-708		R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
CE-709		R3V1			R3V1,R4V1,R5V	R4V ,R5,R7	R4;R4V
G-S 1	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 2-3	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 4-5	R2A	R3V1	R3	R3V1	R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 6	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 7	R2A	R3V1				R3,R4,R5,R7	R4;R4V
G-S 8	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 9	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 10	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 11	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 12	R2A	R3V1	R3	R3V1	R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 13	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S 14	R2A	R3V1				R3,R4	R4;R4V
G-S 15	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S D16	R2A	R3V1	R3	R3V1		R3,R4	R4;R4V
G-S D17	R2A	R3V1	R3	R3V1		R3,R4	R4;R4V
G-S D18	R2A	R3V1	R3	R3V1		R3,R4	R4;R4V
G-S D19	R2A	R3V1	R3	R3V1		R3,R4	R4;R4V
G-S M1	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S M2	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S M3	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S M4	R2A	R3V1			R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
G-S M5	R4	R4V1			R4V1,R5V	R4,R5,R7	
TO 1					R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
TO 2					R3V1,R4V1,R5V	R3,R4,R5,R7	R4;R4V
TO 3			R3	R3V1	R3V1	R3,R4	R4;R4V

1.2 Hydrologic Program

The purpose of the surface and subsurface hydrologic baseline program being conducted on Tract C-a for the Rio Blanco Oil Shale Project is to establish baseline data. These data include precipitation, stream flows and quality, alluvial aquifer monitoring and water quality analyses, and deep oil shale aquifer monitoring and water quality analyses.

RBOSP Progress Report 7 submits to the AOSS the hydrologic data gathered or received during the period of March through May, 1976. This hydrologic report is submitted in two parts: the Interpretive Text and Raw Data Volumes. In the Interpretive Text Volume the text, tables, and figures are the result of the data gathering program. The Raw Data Volume contains the actual data, most of which is in a computer print-out form.

The following is a brief summary of the previous Quarterly Reports:

- Progress Report 2--contains data from the drilling program;
- Progress Report 3--contains data obtained during the formal pumping tests;
- Progress Report 4--contains a detailed hydrologic evaluation of the data gathered to that point in time.
- Progress Report 5--summarizes the annual hydrologic data for calendar year 1975.
- Progress Report 6--contains new data and the interpretation thereof for the sixth quarterly period.

The hydrologic program began in the spring of 1974. These data have been used in both environmental and engineering studies. Analyses of the water quality data to date indicates that the water will be of sufficient quality to be used directly in the mining and associated processes.

1.2.1 Surface Water Monitoring Stations

RBOSP has contracted with the Colorado River Water Conservation District to have the Water Resources Division of the U.S.G.S. construct and monitor a total of eleven stream gaging stations and six rain gaging stations on or near Tract C-a. RBOSP Progress Report 2, 3, 4 and 5 described the operation of these monitoring stations. Of the eleven stream gaging stations, seven monitor all significant drainages associated with Tract C-a, while the remaining four stations monitor the possible processed shale disposal sites in the 84 Mesa. Three storage-type rain gaging stations are located at Dry Fork, Box Elder Gulch, and Corral Gulch near the west line of Tract C-a. Rainfall intensity and recording-type rain gaging stations are located near the drainage divide of Cathedral Bluffs, Stake Spring Draw near confluence of Corral Gulch, and Yellow Creek near White River.

Table 1.2-1 gives the U.S.G.S. identification numbers and locations of the eleven stream gaging stations and six rain gaging stations. Table 1.2-2 shows the data collection schedule.

TABLE 1.2-1

LOCATION AND USGS IDENTIFICATION NUMBERS FOR STREAM AND RAIN GAGING STATIONS

USGS Identification Number	LOCATION
09306237	Dry Fork near west line Tract C-a
09306235	Corral Gulch near west line Tract C-a
09306240	Box Elder Gulch near west line Tract C-a
09306242	Corral Gulch east of Tract C-a
09306230	Stake Springs Draw near confluence with Corral Gulch
09306255	Yellow Creek near White River, Colorado
09306241	"Rinky Dink" Gulch near east line Tract C-a
09306248	Upper Big Duck Creek north of 84 Mesa
09306250	Lower Big Duck Creek north of 84 Mesa
09306246	Tributary to Yellow Creek east of 84 Mesa
09306244	Corral Gulch south of 84 Mesa
	STORAGE-TYPE RAIN GAGES
09306235	Corral Gulch near west line Tract C-a
09306237	Dry Fork near west line Tract C-a
09306240	Box Elder Gulch near west line Tract C-a
	RAINFALL INTENSITY AND RECORDING RAIN GAGES
09306230	Stake Springs Draw near confluence with Corral Gulch
09306255	Yellow Creek near White River, Colorado
No number	Cathedral Bluffs located in NW¼, NW¼, Sec. 14 T2S, R100W

TABLE 1.2-2

DATA COLLECTION SCHEDULE FOR STREAM GAGING STATIONS

Continuously or Automatically

- Flow Rate
- Sediment Discharge
- Temperature
- Specific Conductance

Periodically

- Storage Rain Gages
- Recording Rain Gages
- Rainfall Intensity Gages

Monthly

Water Samples Analyzed For:

- Alkalinity
- Biological Oxygen Demand
- Dissolved Organic Carbon
- Boron
- Calcium
- Conductance
- Fluoride
- Magnesium
- Potassium
- Silica
- Sodium
- Sulfate
- Ammonia
- Bicarbonate
- Carbonate
- Chloride
- Color
- Dissolved Solids
- Kjeldahl Nitrogen
- Nitrate plus Nitrite
- Odor
- Dissolved Phosphate
- Turbidity
- Dissolved Oxygen
- pH
- Temperature
- Total Phosphate
- Ortho Phosphate
- Suspended Organic Carbon

Quarterly

Sample and Analyze:

- COD
- Fecal Coliform
- Pesticides
- Polycyclic Aromatics
- Total Coliform
- Bromide
- Cyanide
- MBAS
- Oil & Grease
- Phenols
- Sulfide
- Radioactivity
  - Gross Alpha
    - 4 pci/l
    - Ra^{226}
  - Gross Beta
    - 100 pci/l
    - Sr^{90}
    - Ce137
- Ba
- Be
- Ge
- Ga
- Ni
- Ti
- V
- Zr
- Al
- As
- Cd
- Cr
- Cu
- Fe
- Pb
- Li
- Mn
- Mo
- Hg
- Se
- Sr
- Zn

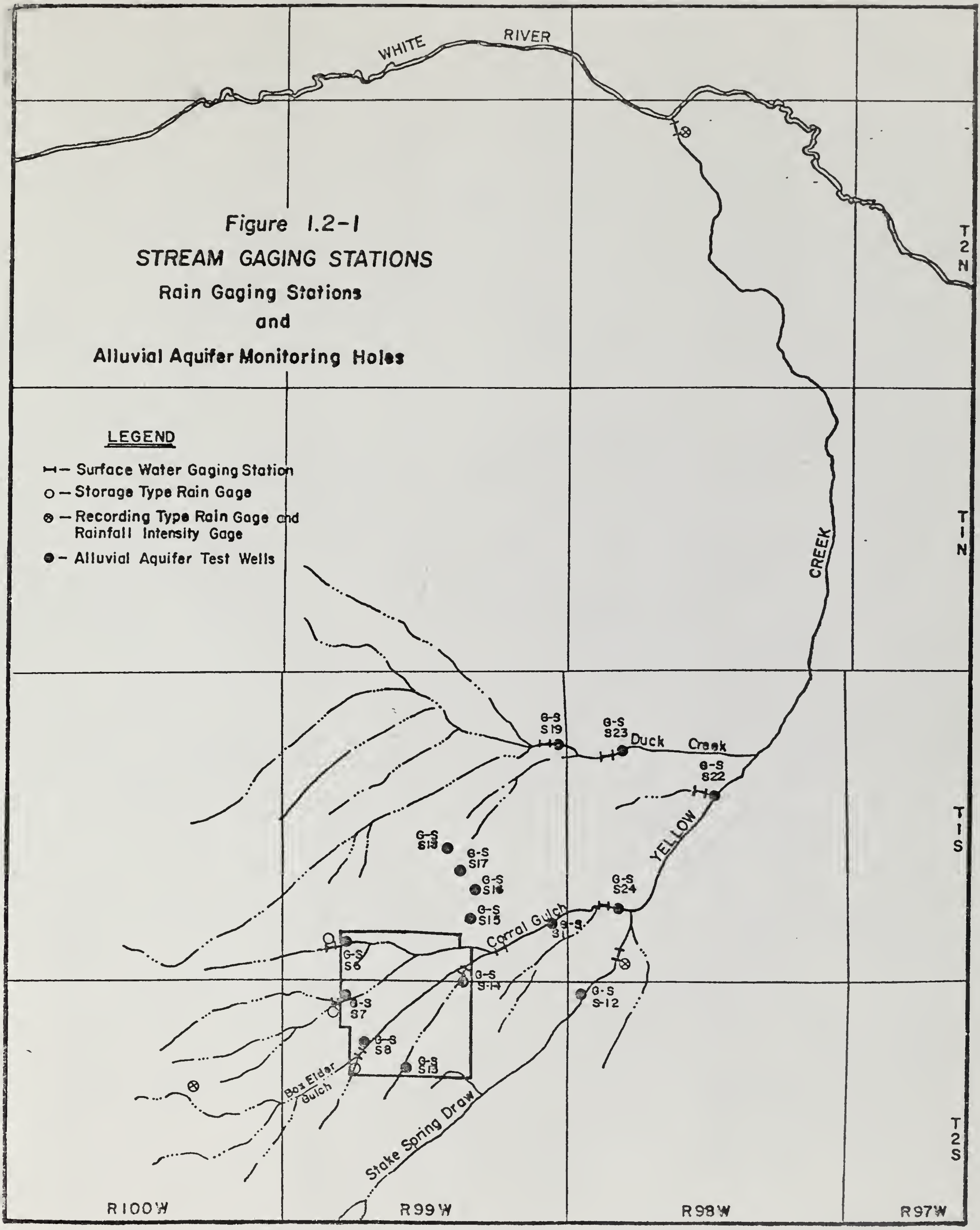


Figure 1.2-1

STREAM GAGING STATIONS

Rain Gaging Stations

and

Alluvial Aquifer Monitoring Holes

1.2.2 Surface Water Data Collection

Data from stream gaging stations reported in RBOSP Progress Report No. 7 include continuous conductivity, temperature, and discharge data through mid-April and water quality data through March, 1976. A delay in processing the data does not allow the data presented in each Progress Report to exactly cover the reporting period.

All but two of the surface water gaging stations reported flows during the period of February and March, 1976. These two stations which recorded no flow were Corral Gulch near the west line of Tract C-a and the Dry Fork surface water gaging station. Of these nine surface water gaging stations reporting flows, five of the stations had not had previously recorded flows. Figures 1.2-2 through 1.2-11, show the mean continuous discharge of the nine surface water gaging stations.

Tables 1.2-3 through 1.2-12 show the amount of the various chemical constituents as reported by the U.S.G.S. during this quarterly period. It should be noted, that these data are preliminary and, therefore, subject to corrections and revisions. As of this date, RBOSP has yet to receive the stream sediment data for the water year 1975.

The stream gaging stations which have recorded constant flows during this reporting period are Corral Gulch east of Tract C-a, Corral Gulch south of 84 Mesa, and Yellow Creek near the White River. These stations have had flows since they were first monitored in March of 1974.

The following stream gaging stations have recorded intermittent flows: Box Elder Gulch near the west line of Tract C-a, Rinky Dink Gulch near east line of Tract C-a, Stake Springs Draw near the confluence with Corral Gulch, tributary to Yellow Creek east of 84 Mesa, Upper Big Duck Creek north of 84 Mesa, and Lower Big Duck Creek north of 84 Mesa. It should be noted that with the exception of the Box Elder Gulch stream gaging station, these stations have no previously recorded flows during the baseline period.

The flows recorded at these previously dry stream gaging stations are associated with above normal seasonal air temperatures and are thought to be due to snow melt runoff. A comparison of the stream flows with the precipitation data supports this conclusion. There were three periods of unusual flow. They are from February 9 through February 14, 1976; February 24 through March 1, 1976; and March 11 through March 24, 1976. The snow melt runoff which occurred in mid-March as evidenced by the Box Elder Gulch stream gaging station would be considered the normal time at which the spring runoff occurs. This year, however, the runoff was of sufficient quantity to cause flows at stream gaging stations which have previously been dry. Since April 5, 1976, these intermittent streams have remained dry.

In summary, as shown on Figures 1.2-2 through 1.2-11, nine stream gaging stations had measured flows and are reported in this Progress Report. The two stations not reported to have had measurable flows are Corral Gulch near the west line of Tract C-a and Dry Fork near the west line of Tract C-a.

Stream discharge at Box Elder Gulch Station near the west line of Tract C-a was recorded in late February and March, 1976. The flow increased from 0.01 cfs in mid-February to 0.06 cfs through the end of the month. Stream flow occurred again from March 11 to 19, during which time, a maximum flow rate of 0.4 cfs was noted. The stream has been dry since early April, 1976.

Stream flow at Corral Gulch near the west line of Tract C-a was reported to be 0.05 cfs in early January. It had declined to no flow by January 10, 1976 and remained dry since then.

Mean discharge at Corral Gulch east of Tract C-a has been fluctuating. The trend was decreasing from 0.5 cfs in January to 0.3 cfs through March, 1976. Noticeable increase in flow rates over short time intervals occurred several times between February and April. The changes are apparently associated with regional precipitation events and snow melt runoff.

Continuous mean discharge data at Corral Gulch south of 84 Mesa was reported and is submitted for the first time in this report. The flow was reported to be 0.2 cfs at the beginning of the water year 1976 and had decreased to 0.01 cfs by early February. Flow rates increased in late February to a maximum of 0.95 cfs and gradually declined to 0.2 by mid-April, 1976.

At the Yellow Creek Station near White River, stream flow had steadily increased from 1.3 cfs in early Febraury to a maximum rate of 3.9 cfs on March 3, 1976. By early April, the flow had declined to approximately 2.2 cfs.

The mean conductivity plotted on Figures 1.2-12 through 1.2-14 are for the surface gaging stations located at Corral Gulch east of Tract C-a, Corral Gulch south of 84 Mesa, and Yellow Creek near the White River, respectively. These are the only three stations at which the U.S.G.S. reported continuous data.

The mean conductivity for Corral Gulch east of Tract C-a fluctuated about the average value of 1100 umhos/cm. The low value reported was slightly less than 600 umhos/cm. This low value falls below the minimum value recorded during the water year 1975. The highest value reported was slightly less than 1500 umhos/cm, which is below the highest value reported during the water year 1975.

The mean conductivity for the Corral Gulch Station south of 84 Mesa generally has declined during water year 1976. The highest value recorded was 2600 umhos/cm. The last value recorded is near the low of 800 umhos/cm.

The mean conductivity for the Yellow Creek Gaging Station near the White River has generally declined from the January highs. The values reported during February and March dropped to a low of approximately 1200 umhos/cm. The lowest value recorded during the water year 1975 was 1170 umhos/cm.

The mean temperature data collected for the three perennial gaging stations is shown on Figures 1.2-15 through 1.2-17. The general mean temperature trend is warming as the seasonal temperatures increase during the spring.

There are three types of precipitation gages used for collecting data by the U.S.G.S. for RBOSP. The storage precipitation gages allow precipitation to be collected and measured periodically. The second type of precipitation gage is the recording type gage which allows the measurement of precipitation on a daily basis. The third type is the rainfall-intensity gage which records the time of each rainfall event and measures precipitation depth with a time increment of five minutes. Locations of the precipitation gaging stations are shown in Figure 1.2-1.

Recording type precipitation data indicated that March and April were the two wettest months during the period from January through late May, 1976, averaging 10-12 precipitation events per month. Relatively wide-spread precipitation events occurred several times as recorded in early March and mid-April. On March 2, maximum precipitation of 0.73 and 0.77 inches were observed at Yellow Creek near White River and Stake Springs Draw near Confluence with Corral Gulch stations respectively, while 0.6 inches of moisture had fallen near Cathedral Bluff on March 25, 1976.

No storage type precipitation data were available at Dry Fork and Box Elder Gulch near west line of Tract C-a from January through March, 1976. However, the station at the Corral Gulch near west line Tract C-a recorded a fair amount of moisture averaging 0.8 inch per month over the same period. Wide-spread rain showers were also evidenced by the storage type precipitation data collected in mid-April.

No new rainfall intensity data were received for this quarter. Table 1.2-13 is a summary of the precipitation data from January through late May, 1976. Figures 1.2-21 through 1.2-23 are plots of data from the recording type rain gages. Figures 1.2-24 through 1.2-26 are plots of the storage type precipitation data.

TABLE 1.2-3
SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306240
BOX ELDER GULCH NEAR WEST LINE TRACT C-a
YEAR 1976

	Mar. 18										
1. Alkalinity (mg/l)	74										
2. Aluminum (ug/l)	40										
3. Ammonia (mg/l)	.32										
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)											
6. Barium (ug/l)	50										
7. Beryllium (ug/l)	<1										
8. Bicarbonate (mg/l)	90										
9. Bismuth (ug/l)	<4										
10. Boron (ug/l)	110										
11. Cadmium (ug/l)	1										
12. Carbonate (mg/l)	0										
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	3.0										
15. Chromium (ug/l)	0										
16. Cobalt (ug/l)	<3										
17. COD	100										
18. Coliform, Total & Fecal											
19. Color (PCU)	100										
20. Conductivity, Specific	400										
21. Copper (ug/l)	13										
22. Cyanide (mg/l)	.00										
23. Discharge (CFS)											
24. Discharge, Instantaneous	.01										
25. Dissolved Oxygen (mg/l)											
26. Fluoride (mg/l)	.1										
27. Gallium (ug/l)	<1										
28. Germanium (ug/l)	<3										
29. Hardness (Ca, Mg) (mg/l)	65										
30. Hardness, Non-Carbonate (mg/l)	0										
31. Iron (ug/l)	280										
32. Kjeldahl Nitrogen (mg/l)	30										
33. Lead (ug/l)	13										
34. Lithium (ug/l)	10										
35. Magnesium (mg/l)	5.4										
36. Manganese (ug/l)	30										
37. Mercury (ug/l)	.0										
38. Molybdenum (ug/l)	3										
39. Nickel (ug/l)	<3										
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	.23										
43. Nitrogen, Ammonia	.25										
44. Odor (Severity)											
45. Oil & Grease (mg/l)	2										
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.35										
48. Pesticides	0										
49. pH	8.1										
50. Phosphorus, Total (mg/l)	.83										
51. Potassium (mg/l)	11										
52. Selenium (ug/l)	0										
53. Silica (mg/l)	3.2										
54. Silver (ug/l)	0										
55. Sodium (mg/l)	2.7										
56. Sodium Adsorption Ratio	.1										
57. Sodium (%)	7										
58. Solids, Dissolved (mg/l)	95										
59. Solids, Dissolved T/D	.00										
60. Solids, Dissolved T/Ac-Ft	.13										
61. Solids, Suspended											
62. Strontium (ug/l)	190										
63. Sulfate (mg/l)	5.5										
64. Sulfide (mg/l)	.2										
65. Temperature (°C)	3.0										
66. Tin (ug/l)	<5										
67. Titanium (ug/l)	<1										
68. Turbidity (JTU)											
69. Vanadium (ug/l)	<3.0										
70. Zinc (ug/l)	30										
71. Zirconium (ug/l)	<5										
72. Calcium (mg/l)	17										
73. Complete Element Spec											
74. Radioactivity											
Gross Alpha (pCi/l)											
Radium 226*											
Gross Beta											
Thorium 230**											
Uranium**											
Total Organic Carbon (mg/l)	36.4										
If TOC 10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	34										
Organic Carbon, Suspended	2.4										
Phenols											
[illegible]											
[illegible]	.35										
[illegible]	2.5										
Phosphorus, Dissolved											

TABLE 1.2-4
SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306235
CORRAL GULCH NEAR WEST LINE TRACT C-a
YEAR 1976

	Jan. 02										
1. Alkalinity (mg/l)	343										
2. Aluminum (ug/l)	30										
3. Ammonia (mg/l)	.12										
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	4										
6. Barium (ug/l)	60										
7. Beryllium (ug/l)	<3										
8. Bicarbonate (mg/l)	418										
9. Bismuth (ug/l)	<15										
10. Boron (ug/l)	80										
11. Cadmium (ug/l)	7										
12. Carbonate (mg/l)	0										
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	11										
15. Chromium (ug/l)	<15										
16. Cobalt (ug/l)	<15										
17. COD	12										
18. Coliform, Total & Fecal											
19. Color (PCU)	5										
20. Conductivity, Specific	1100										
21. Copper (ug/l)	5										
22. Cyanide (mg/l)	.00										
23. Discharge (CFS)											
24. Discharge, Instantaneous	.50										
25. Dissolved Oxygen (mg/l)	11										
26. Fluoride (mg/l)	.3										
27. Gallium (ug/l)	<7										
28. Germanium (ug/l)	<40										
29. Hardness (Ca, Mg) (mg/l)	490										
30. Hardness, Non-Carbonate (mg/l)	140										
31. Iron (ug/l)	30										
32. Kjeldahl Nitrogen (mg/l)	.69										
33. Lead (ug/l)	<15										
34. Lithium (ug/l)	20										
35. Magnesium (mg/l)	60										
36. Manganese (ug/l)	20										
37. Mercury (ug/l)	.0										
38. Molybdenum (ug/l)	40										
39. Nickel (ug/l)	<15										
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	1.1										
43. Nitrogen, Ammonia	.09										
44. Odor (Severity)											
45. Oil & Grease (mg/l)	0										
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.00										
48. Pesticides	0										
49. pH	--										
50. Phosphorus, Total (mg/l)	.02										
51. Potassium (mg/l)	1.5										
52. Selenium (ug/l)	2										
53. Silica (mg/l)	19										
54. Silver (ug/l)	<2										
55. Sodium (mg/l)	84										
56. Sodium Adsorption Ratio	1.7										
57. Sodium ( )	27										
58. Solids, Dissolved (mg/l)	793										
59. Solids, Dissolved T/D	1.07										
60. Solids, Dissolved T/Ac-Ft	1.08										
61. Solids, Suspended											
62. Strontium (ug/l)	1300										
63. Sulfate (mg/l)	310										
64. Sulfide (mg/l)	.0										
65. Temperature (°C)	.5										
66. Tin (ug/l)	<15										
67. Titanium (ug/l)	<10										
68. Turbidity (JTU)											
69. Vanadium (ug/l)	<15										
70. Zinc (ug/l)	10										
71. Zirconium (ug/l)	<40										
72. Calcium (mg/l)	95										
73. Complete Element Scan											
74. Radioactivity											
Gross Alpha (pci)	<9.8										
Radium 226*											
Gross Beta	5.2										
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)	16.5										
If TOC > 10 mg/liter, then:											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	14										
Organic Carbon, Suspended	2.5										
Phenolic											
(Acid Extraction)											
76. Total Ortho Phosphorous (mg/l)	.00										
77. Phosphate	.06										
78. Phosphorus, Dissolved											

TABLE 1.2-5
SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306242
CORRAL GULCH EAST OF TRACT C-a
YEAR 1976

	Jan. 29	Feb. 18	Mar. 11								
1. Alkalinity (mg/l)	362	414	419								
2. Aluminum (ug/l)	10	10	20								
3. Ammonia (mg/l)											
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	4	4	6								
6. Barium (ug/l)			60								
7. Beryllium (ug/l)			<4								
8. Bicarbonate (mg/l)	441	505	511								
9. Bismuth (ug/l)			<25								
10. Boron (ug/l)	140	120	100								
11. Cadmium (ug/l)			1								
12. Carbonate (mg/l)	0	0	0								
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	10	9.4	12								
15. Chromium (ug/l)			<20								
16. Cobalt (ug/l)			<20								
17. COD			12								
18. Coliform, Total & Fecal			2								
19. Color (PCU)	3	4	4								
20. Conductivity, Specific	1200	1300	1250								
21. Copper (ug/l)			3								
22. Cyanide (mg/l)			.00								
23. Discharge (CFS)											
24. Discharge, Instantaneous	.42	.55	.35								
25. Dissolved Oxygen (mg/l)	7.7	10.9	10.0								
26. Fluoride (mg/l)	.4	.4	.4								
27. Gallium (ug/l)			<7								
28. Germanium (ug/l)			<20								
29. Hardness (Ca, Mg) (mg/l)	470	460	520								
30. Hardness, Non-Carbonate (mg/l)	110	42	89								
31. Iron (ug/l)	10	10	<20								
32. Kjeldahl Nitrogen (mg/l)	.40	.22	.11								
33. Lead (ug/l)			<20								
34. Lithium (ug/l)			20								
35. Magnesium (mg/l)	63	60	70								
36. Manganese (ug/l)			40								
37. Mercury (ug/l)			.0								
38. Molybdenum (ug/l)			50								
39. Nickel (ug/l)			<20								
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	.34	.37	.33								
43. Nitrogen, Ammonia	.04	--	.04								
44. Odor (Severity)											
45. Oil & Grease (mg/l)			0								
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.01	.05	.01								
48. Pesticides											
49. pH	7.8	8.2	7.7								
50. Phosphorus, Total (mg/l)	.00	.03	.04								
51. Potassium (mg/l)	1.5	1.4	1.7								
52. Selenium (ug/l)			<2								
53. Silica (mg/l)	20	20	21								
54. Silver (ug/l)			<2								
55. Sodium (mg/l)	110	100	120								
56. Sodium Adsorption Ratio	2.2	2.0	2.3								
57. Sodium (%)	34	32	34								
58. Solids, Dissolved (mg/l)	821	787	872								
59. Solids, Dissolved T/D	.93	1.17	.82								
60. Solids, Dissolved T/Ac-Ft	1.12	1.07	1.19								
61. Solids, Suspended											
62. Strontium (ug/l)	2000	1800	1700								
63. Sulfate (mg/l)	310	260	300								
64. Sulfide (mg/l)			.0								
65. Temperature (°C)	8.5	.0	9.0								
Tin (ug/l)			<20								
67. Titanium (ug/l)			<10								
68. Turbidity (JTU)											
69. Vanadium (ug/l)			<10								
70. Zinc (ug/l)			10								
71. Zirconium (ug/l)			<30								
72. Calcium (mg/l)	85	83	91								
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)											
Radium 226*											
Gross Beta											
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)	14.3	0	4.5								
If TOC >10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	14	6.7	4.2								
Organic Carbon, Suspended	.3	.3	.3								
Phenols											
Sulfur (Acid Extraction)											
76. Total Ortho-Phosphorous (mg/l)	.01	.05	.01								
77. Phosphate	.00	.09	.12								
78. Phosphorus, Dissolved											

TABLE 1.2-6
SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306241
"RINKY DINK" GULCH NEAR EAST LINE TRACT C-a
YEAR 1976

	Feb. 13										
1. Alkalinity (mg/l)	73										
2. Aluminum (ug/l)	250										
3. Ammonia (mg/l)	.12										
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	3										
6. Barium (ug/l)	0										
7. Beryllium (ug/l)											
8. Bicarbonate (mg/l)	89										
9. Bismuth (ug/l)											
10. Boron (ug/l)	100										
11. Cadmium (ug/l)	1										
12. Carbonate (mg/l)	0										
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	1.8										
15. Chromium (ug/l)	0										
16. Cobalt (ug/l)											
17. COD	240										
18. Coliform, Total & Fecal											
19. Color (PCU)	280										
20. Conductivity, Specific	160										
21. Copper (ug/l)	13										
22. Cyanide (mg/l)	.00										
23. Discharge (CFS)											
24. Discharge, Instantaneous	.43										
25. Dissolved Oxygen (mg/l)											
26. Fluoride (mg/l)	.3										
27. Gallium (ug/l)											
28. Germanium (ug/l)											
29. Hardness (Ca, Mg) (mg/l)	37										
30. Hardness, Non-Carbonate (mg/l)	0										
31. Iron (ug/l)	280										
32. Kjeldahl Nitrogen (mg/l)	1.1										
33. Lead (ug/l)	10										
34. Lithium (ug/l)	10										
35. Magnesium (mg/l)	2.2										
36. Manganese (ug/l)											
37. Mercury (ug/l)	.1										
38. Molybdenum (ug/l)											
39. Nickel (ug/l)											
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	.72										
43. Nitrogen, Ammonia	.09										
44. Odor (Severity)											
45. Oil & Grease (mg/l)											
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.08										
48. Pesticides											
49. pH	8.5										
50. Phosphorus, Total (mg/l)	.70										
51. Potassium (mg/l)	2.3										
52. Selenium (ug/l)	0										
53. Silica (mg/l)	5.0										
54. Silver (ug/l)											
55. Sodium (mg/l)	24										
56. Sodium Adsorption Ratio	1.7										
57. Sodium ( )	57										
58. Solids, Dissolved (mg/l)	102										
59. Solids, Dissolved T/D	.12										
60. Solids, Dissolved T/Ac-Ft	.14										
61. Solids, Suspended											
62. Strontium (ug/l)	100										
63. Sulfate (mg/l)	6.8										
64. Sulfide (mg/l)											
65. Temperature (°C)	1.0										
66. Tin (ug/l)											
67. Titanium (ug/l)											
68. Turbidity JTU)											
69. Vanadium (ug/l)											
70. Zinc (ug/l)	90										
71. Zirconium (ug/l)											
72. Calcium (mg/l)	11										
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)											
Radium 226*											
Gross Beta											
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)	70.9										
If TOC >10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	67										
Organic Carbon, Suspended	3.9										
Phenols											
Sulfur (Acid Extraction)											
76 Total Ortho-Phosphorous (mg/l)	.03										
77. Phosphate	2.1										
78. Phosphorus, Dissolved											

TABLE 1.2-7
SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306230
STAKE SPRINGS DRAW NEAR CONFLUENCE WITH CORRAL GULCH
YEAR 1976

	Feb. 13										
1. Alkalinity (mg/l)	114										
2. Aluminum (ug/l)	100										
3. Ammonia (mg/l)	.14										
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	2										
6. Barium (ug/l)											
7. Beryllium (ug/l)											
8. Bicarbonate (mg/l)	139										
9. Bismuth (ug/l)											
10. Boron (ug/l)	160										
11. Cadmium (ug/l)											
12. Carbonate (mg/l)	0										
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	4.2										
15. Chromium (ug/l)											
16. Cobalt (ug/l)											
17. COD											
18. Coliform, Total & Fecal											
19. Color (PCU)	100										
20. Conductivity, Specific	280										
21. Copper (ug/l)											
22. Cyanide (mg/l)											
23. Discharge (CFS)											
24. Discharge, Instantaneous	.02										
25. Dissolved Oxygen (mg/l)											
26. Fluoride (mg/l)	.1										
27. Gallium (ug/l)											
28. Germanium (ug/l)											
29. Hardness (Ca, Mg) (mg/l)	0										
30. Hardness, Non-Carbonate (mg/l)	94										
31. Iron (ug/l)	180										
32. Kjeldahl Nitrogen (mg/l)	2.4										
33. Lead (ug/l)											
34. Lithium (ug/l)											
35. Magnesium (mg/l)	6.9										
36. Manganese (ug/l)											
37. Mercury (ug/l)											
38. Molybdenum (ug/l)											
39. Nickel (ug/l)											
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	.42										
43. Nitrogen, Ammonia	.11										
44. Odor (Severity)											
45. Oil & Grease (mg/l)											
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.16										
48. Pesticides	0										
49. pH	8.4										
50. Phosphorus, Total (mg/l)	.34										
51. Potassium (mg/l)	5.4										
52. Selenium (ug/l)											
53. Silica (mg/l)	5.3										
54. Silver (ug/l)											
55. Sodium (mg/l)	17										
56. Sodium Adsorption Ratio	.8										
57. Sodium ( )	27										
58. Solids, Dissolved (mg/l)	154										
59. Solids, Dissolved T/D	.01										
60. Solids, Dissolved T/Ac-Ft	.21										
61. Solids, Suspended											
62. Strontium (ug/l)	390										
63. Sulfate (mg/l)	17										
64. Sulfide (mg/l)											
65. Temperature (°C)	3.0										
66. Tin (ug/l)											
67. Titanium (ug/l)											
68. Turbidity (JTU)											
69. Vanadium (ug/l)											
70. Zinc (ug/l)											
71. Zirconium (ug/l)											
72. Calcium (mg/l)	26										
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)											
Radium 226*											
Gross Beta											
Thorium 230**											
Uranium **											
75. Total Organic Carbon (mg/l)	68.4										
If TOC 10 mg liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	67										
Organic Carbon, Suspended	1.4										
Phenols											
Sulfur (Acid Extraction)											
76. Total [illegible] Phosphorous	.16										
77. [illegible]	1.0										
78. Inorganic Carbon, Dissolved											

TABLE 1.2-8
SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306244
CORRAL GULCH SOUTH OF 84 MESA
YEAR 1976

	Jan. 29	Feb. 13	Mar. 11								
1. Alkalinity (mg/l)	523	505	489								
2. Aluminum (ug/l)	10	10	<20								
3. Ammonia (mg/l)											
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	2	2	4								
6. Barium (ug/l)			200								
7. Beryllium (ug/l)			<5								
8. Bicarbonate (mg/l)	638	616	596								
9. Bismuth (ug/l)			<35								
10. Boron (ug/l)	180	160	150								
11. Cadmium (ug/l)			1								
12. Carbonate (mg/l)	0	0	0								
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	18	19	16								
15. Chromium (ug/l)			<25								
16. Cobalt (ug/l)			<25								
17. COD			26								
18. Coliform, Total & Fecal			94								
19. Color (PCU)	4	15	15								
20. Conductivity, Specific	1750	1900	1700								
21. Copper (ug/l)			2								
22. Cyanide (mg/l)			.00								
23. Discharge (CFS)											
24. Discharge, Instantaneous	.01	.10	.07								
25. Dissolved Oxygen (mg/l)	5.1	11.7	13.4								
26. Fluoride (mg/l)	.3	.4	.3								
27. Gallium (ug/l)			<10								
28. Germanium (ug/l)			<30								
29. Hardness (Ca, Mg) (mg/l)	730	690	680								
30. Hardness, Non-Carbonate (mg/l)	210	180	190								
31. Iron (ug/l)	20	30	<30								
32. Kjeldahl Nitrogen (mg/l)	.76	1.0	.96								
33. Lead (ug/l)			<25								
34. Lithium (ug/l)			10								
35. Magnesium (mg/l)	110	100	97								
36. Manganese (ug/l)			60								
37. Mercury (ug/l)			.0								
38. Molybdenum (ug/l)			60								
39. Nickel (ug/l)			<25								
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	.71	.85	.68								
43. Nitrogen, Ammonia	.05	.15	.08								
44. Odor (Severity)											
45. Oil & Grease (mg/l)			0								
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.02	.01	.03								
48. Pesticides			0								
49. pH	7.8	8.2	8.3								
50. Phosphorus, Total (mg/l)	.00	.05	.06								
51. Potassium (mg/l)	2.6	2.7	3.0								
52. Selenium (ug/l)			2								
53. Silica (mg/l)	17	18	20								
54. Silver (ug/l)			<3								
55. Sodium (mg/l)	190	170	170								
56. Sodium Adsorption Ratio	3.1	2.8	2.9								
57. Sodium (%)	36	35	35								
58. Solids, Dissolved (mg/l)	1330	1240	1210								
59. Solids, Dissolved T/D	.04	.33	.23								
60. Solids, Dissolved T/Ac-Ft	1.88	1.69	1.65								
61. Solids, Suspended											
62. Strontium (ug/l)	2800	2700	2300								
63. Sulfate (mg/l)	610	510	490								
64. Sulfide (mg/l)			.2								
65. Temperature (°C)	6.0	8.0	9.0								
66. Tin (ug/l)			<20								
67. Titanium (ug/l)			<20								
68. Turbidity (JTU)											
69. Vanadium (ug/l)			<15								
70. Zinc (ug/l)			10								
71. Zirconium (ug/l)			10								
72. Calcium (mg/l)	110	110	110								
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)	<7.8										
Radium 226*											
Gross Beta	4.5										
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)	11.4	13.7	13.3								
If TOC >10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	11	13	13								
Organic Carbon, Suspended	.4	.7	.3								
Phenols											
Sulfur (Acid Extraction)											
76. Total Ortho-Phosphorous (mg/l)											
77. Phosphate	.00	.15	.18								
78. Phosphorus, Dissolved											

TABLE 1.2-9

SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306248
UPPER BIG DUCK CREEK NORTH OF 84 MESA
YEAR 1976

	Feb. 14										
1. Alkalinity (mg/l)	107										
2. Aluminum (ug/l)	230										
3. Ammonia (mg/l)											
4. -Aromatics, Polycyclic											
5. Arsenic (ug/l)	4										
6. Barium (ug/l)	100										
7. Beryllium (ug/l)	<1										
8. Bicarbonate (mg/l)	131										
9. Bismuth (ug/l)	<4										
10. Boron (ug/l)	170										
11. Cadmium (ug/l)	<3										
12. Carbonate (mg/l)	0										
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	4.8										
15. Chromium (ug/l)	<3										
16. Cobalt (ug/l)	<[illegible]										
17. COD	76										
18. Coliform, Total & Fecal											
19. Color (PCU)	180										
20. Conductivity, Specific	220										
21. Copper (ug/l)	10										
22. Cyanide (mg/l)	.00										
23. Discharge (CFS)											
24. Discharge, Instantaneous	2.1										
25. Dissolved Oxygen (mg/l)											
26. Fluoride (mg/l)	1										
27. Gallium (ug/l)	<2										
28. Germanium (ug/l)	<4										
29. Hardness (Ca, Mg) (mg/l)	73										
30. Hardness, Non-Carbonate (mg/l)	0										
31. Iron (ug/l)	170										
32. Kjeldahl Nitrogen (mg/l)	3.8										
33. Lead (ug/l)	<4										
34. Lithium (ug/l)	2										
35. Magnesium (mg/l)	5.6										
36. Manganese (ug/l)	20										
37. Mercury (ug/l)	.1										
38. Molybdenum (ug/l)	5										
39. Nickel (ug/l)	<4										
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	45										
43. Nitrogen, Ammonia	.65										
44. Odor (Severity)											
45. Oil & Grease (mg/l)	2										
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.16										
48. Pesticides											
49. pH	8.3										
50. Phosphorus, Total (mg/l)	.81										
51. Potassium (mg/l)	15										
52. Selenium (ug/l)	0										
53. Silica (mg/l)	5.2										
54. Silver (ug/l)	0										
55. Sodium (mg/l)	18										
56. Sodium Adsorption Ratio	.9										
57. Sodium (%)	30										
58. Solids, Dissolved (mg/l)	149										
59. Solids, Dissolved T/D	.87										
60. Solids, Dissolved T/Ac-Ft	.20										
61. Solids, Suspended											
62. Strontium (ug/l)	220										
63. Sulfate (mg/l)	12										
64. Sulfide (mg/l)	8										
65. Temperature (°C)	.5										
66. Tin (ug/l)	<4										
67. Titanium (ug/l)	10										
68. Turbidity JTU)											
69. Vanadium (ug/l)	<4.0										
70. Zinc (ug/l)	20										
71. Zirconium (ug/l)	<8										
72. Calcium (mg/l)	20										
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)	28.4										
Radium 226*											
Gross Beta	33										
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)											
If TOC >10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved											
Organic Carbon, Suspended											
Phenols											
Sulfur (Acid Extraction)											
76. Total Ortho-Phosphorous (mg/l)	.16										
77. Phosphate	2.5										
78. Phosphorus, Dissolved											

TABLE 1.2-10

SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306250
LOWER BIG DUCK CREEK NORTH OF 84 MESA
YEAR 1976

	Feb. 14										
1. Alkalinity (mg/l)	135										
2. Aluminum (ug/l)	200										
3. Ammonia (mg/l)											
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	2										
6. Barium (ug/l)	100										
7. Beryllium (ug/l)											
8. Bicarbonate (mg/l)	164										
9. Bismuth (ug/l)											
10. Boron (ug/l)	130										
11. Cadmium (ug/l)	1										
12. Carbonate (mg/l)	0										
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	4.2										
15. Chromium (ug/l)	0										
16. Cobalt (ug/l)											
17. COD	87										
18. Coliform, Total & Fecal											
19. Color (PCU)	180										
20. Conductivity, Specific	320										
21. Copper (ug/l)	14										
22. Cyanide (mg/l)	.00										
23. Discharge (CFS)											
24. Discharge, Instantaneous	.68										
25. Dissolved Oxygen (mg/l)											
26. Fluoride (mg/l)	.1										
27. Gallium (ug/l)											
28. Germanium (ug/l)											
29. Hardness (Ca, Mg) (mg/l)	78										
30. Hardness, Non-Carbonate (mg/l)	0										
31. Iron (ug/l)	340										
32. Kjeldahl Nitrogen (mg/l)	3.1										
33. Lead (ug/l)	7										
34. Lithium (ug/l)	10										
35. Magnesium (mg/l)	5.6										
36. Manganese (ug/l)											
37. Mercury (ug/l)	.1										
38. Molybdenum (ug/l)											
39. Nickel (ug/l)											
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	.52										
43. Nitrogen, Ammonia	.34										
44. Odor (Severity)											
45. Oil & Grease (mg/l)											
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)	.17										
48. Pesticides											
49. pH	8.7										
50. Phosphorus, Total (mg/l)	.49										
51. Potassium (mg/l)	13										
52. Selenium (ug/l)	0										
53. Silica (mg/l)	5.8										
54. Silver (ug/l)											
55. Sodium (mg/l)	25										
56. Sodium Adsorption Ratio	1.2										
57. Sodium (%)	37										
58. Solids, Dissolved (mg/l)	172										
59. Solids, Dissolved T/D	.32										
60. Solids, Dissolved T/Ac-Ft	.23										
61. Solids, Suspended											
62. Strontium (ug/l)	260										
63. Sulfate (mg/l)	11										
64. Sulfide (mg/l)											
65. Temperature (°C)	.5										
66. Tin (ug/l)											
67. Titanium (ug/l)											
68. Turbidity (JTU)											
69. Vanadium (ug/l)											
70. Zinc (ug/l)	50										
71. Zirconium (ug/l)											
72. Calcium (mg/l)	22										
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)	13.6										
Radium 226*											
Gross Beta	25.0										
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)											
If TOC 10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved											
Organic Carbon, Suspended											
Phenols											
Sulfur (Acid Extraction)											
76. Total Ortho-Phosphorous (mg/l)	.17										
77. Phosphate	1.5										
78. Phosphorus, Dissolved											

TABLE 1.2-11

SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306246
TRIBUTARY TO YELLOW CREEK EAST OF 84 MESA
YEAR 1976

	Feb. 13									
1. Alkalinity (mg/l)	99									
2. Aluminum (ug/l)	30									
3. Ammonia (mg/l)										
4. Aromatics, Polycyclic										
5. Arsenic (ug/l)	1									
6. Barium (ug/l)										
7. Beryllium (ug/l)										
8. Bicarbonate (mg/l)	121									
9. Bismuth (ug/l)										
10. Boron (ug/l)	110									
11. Cadmium (ug/l)										
12. Carbonate (mg/l)	0									
13. Carbon Dioxide (mg/l)										
14. Chloride (mg/l)	1.9									
15. Chromium (ug/l)										
16. Cobalt (ug/l)										
17. COD										
18. Coliform, Total & Fecal										
19. Color (PCU)	450									
20. Conductivity, Specific	100									
21. Copper (ug/l)										
22. Cyanide (mg/l)										
23. Discharge (CFS)										
24. Discharge, Instantaneous	8.0									
25. Dissolved Oxygen (mg/l)										
26. Fluoride (mg/l)	.1									
27. Gallium (ug/l)										
28. Germanium (ug/l)										
29. Hardness (Ca, Mg) (mg/l)	52									
30. Hardness, Non-Carbonate (mg/l)	0									
31. Iron (ug/l)	230									
32. Kjeldahl Nitrogen (mg/l)	1.1									
33. Lead (ug/l)										
34. Lithium (ug/l)										
35. Magnesium (mg/l)	1.7									
36. Manganese (ug/l)										
37. Mercury (ug/l)										
38. Molybdenum (ug/l)										
39. Nickel (ug/l)										
40. Nitrate (mg/l)										
41. Nitrite (mg/l)										
42. Nitrite Plus Nitrate (mg/l)	.34									
43. Nitrogen, Ammonia	.76									
44. Odor (Severity)										
45. Oil & Grease (mg/l)										
46. Ortho-Phosphate (mg/l)										
47. Ortho-Phosphorus (mg/l)	.05									
48. Pesticides										
49. pH	8.5									
50. Phosphorus, Total (mg/l)	2.8									
51. Potassium (mg/l)	1.5									
52. Selenium (ug/l)										
53. Silica (mg/l)	5.6									
54. Silver (ug/l)										
55. Sodium (mg/l)	7.3									
56. Sodium Adsorption Ratio	.4									
57. Sodium (%)	23									
58. Solids, Dissolved (mg/l)	104									
59. Solids, Dissolved T/D	2.25									
60. Solids, Dissolved T/Ac-Ft	.14									
61. Solids, Suspended										
62. Strontium (ug/l)	180									
63. Sulfate (mg/l)	5.1									
64. Sulfide (mg/l)										
65. Temperature (°C)	.5									
66. Tin (ug/l)										
67. Titanium (ug/l)										
68. Turbidity JTU)										
69. Vanadium (ug/l)										
70. Zinc (ug/l)										
71. Zirconium (ug/l)										
72. Calcium (mg/l)	18									
73. Complete Element Span										
74. Radioactivity										
Gross Alpha (pci)										
Radium 226*										
Gross Beta										
Thorium 230**										
Uranium**										
75. Total Organic Carbon (mg/l)	82.6									
If TOC >10 mg/liter, then										
Nitrogen (Base Extraction)										
Organic Carbon, Dissolved	76									
Organic Carbon, Suspended	6.6									
Phenols										
Sulfur (Acid Extraction)										
76. Total Ortho-Phosphorous (mg/l)	.05									
77. Phosphate	8.6									
78. Phosphorus, Dissolved										

TABLE 1.2-12

SUMMARY WATER ANALYSIS
STREAM GAGING STATION, USGS 09306255
YELLOW CREEK NEAR WHITE RIVER
YEAR 1976

	Jan. 28	Feb. 26	March 30								
1. Alkalinity (mg/l)	1670	1280	1530								
2. Aluminum (ug/l)	20	50	10								
3. Ammonia (mg/l)	.35	.30	0.18								
4. Aromatics, Polycyclic											
5. Arsenic (ug/l)	4	6	--								
6. Barium (ug/l)			200								
7. Beryllium (ug/l)											
8. Bicarbonate (mg/l)	1460	596	1380								
9. Bismuth (ug/l)											
10. Boron (ug/l)	690	580	720								
11. Cadmium (ug/l)			1								
12. Carbonate (mg/l)	283	478	240								
13. Carbon Dioxide (mg/l)											
14. Chloride (mg/l)	150	130	140								
15. Chromium (ug/l)			0								
16. Cobalt (ug/l)											
17. COD			15								
18. Coliform, Total & Fecal											
19. Color (PCU)	5	20	10								
20. Conductivity, Specific	3880	2300	3700								
21. Copper (ug/l)			4								
22. Cyanide (mg/l)			0.00								
23. Discharge (CFS)											
24. Discharge, Instantaneous	2.0	3.5									
25. Dissolved Oxygen (mg/l)	12.2	10.9	11.1								
26. Fluoride (mg/l)	2.5	2.0	2.4								
27. Gallium (ug/l)											
28. Germanium (ug/l)											
29. Hardness (Ca, Mg) (mg/l)	590	550	500								
30. Hardness, Non-Carbonate (mg/l)	0	0									
31. Iron (ug/l)	20	20	--								
32. Kjeldahl Nitrogen (mg/l)	1.0	.90	--								
33. Lead (ug/l)			6								
34. Lithium (ug/l)			160								
35. Magnesium (mg/l)	120	110	100								
36. Manganese (ug/l)											
37. Mercury (ug/l)			0								
38. Molybdenum (ug/l)											
39. Nickel (ug/l)											
40. Nitrate (mg/l)											
41. Nitrite (mg/l)											
42. Nitrite Plus Nitrate (mg/l)	1.6	1.2	1.0								
43. Nitrogen, Ammonia	.27	.23	.14								
44. Odor (Severity)											
45. Oil & Grease (mg/l)			0								
46. Ortho-Phosphate (mg/l)											
47. Ortho-Phosphorus (mg/l)											
48. Pesticides											
49. pH	8.7	8.7	8.7								
50. Phosphorus, Total (mg/l)	.16	.46	.12								
51. Potassium (mg/l)	4.2	4.1	7.0								
52. Selenium (ug/l)			1								
53. Silica (mg/l)	13	14	12								
54. Silver (ug/l)											
55. Sodium (mg/l)	850	640	830								
56. Sodium Adsorption Ratio	15	12	16								
57. Sodium (%)	76	72	78								
58. Solids, Dissolved (mg/l)	2760	2240	2630								
59. Solids, Dissolved T/D	15.2	21.4	--								
60. Solids, Dissolved T/Ac-Ft	3.75	3.05	3.58								
61. Solids, Suspended											
62. Strontium (ug/l)	3100	3200	2700								
63. Sulfate (mg/l)	570	520	570								
64. Sulfide (mg/l)			0.6								
65. Temperature (°C)	0	1.0	1.0								
66. Tin (ug/l)											
67. Titanium (ug/l)											
68. Turbidity (JTU)											
69. Vanadium (ug/l)											
70. Zinc (ug/l)											
71. Zirconium (ug/l)											
72. Calcium (mg/l)	35	39	34								
73. Complete Element Span											
74. Radioactivity											
Gross Alpha (pci)											
Radium 226*											
Gross Beta											
Thorium 230**											
Uranium**											
75. Total Organic Carbon (mg/l)	13.4										
If TOC >10 mg/liter, then											
Nitrogen (Base Extraction)											
Organic Carbon, Dissolved	6.9	11	12								
Organic Carbon, Suspended		2.4	1.1								
Phenols											
Sulfur (Acid Extraction)											
76 Total Ortho-Phosphorous (mg/l)	.09	.07	.09								
77. Phosphate	.49	1.4	.37								
78. Phosphorus, Dissolved											

TABLE 1.2-13

PRECIPITATION SUMMARY

1976

Recording Type Rain Gage Locations	JANUARY			FEBRUARY			MARCH		
	Maximum	Total	Number of Days	Maximum	Total	Number of Days	Maximum	Total	Number of Days
Stake Springs Draw near confluence with Corral Gulch	0.05	0.13	4	0.30	0.94	7	0.77	1.63	12
Yellow Creek near White River	0.14	0.29	5	0.19	0.52	6	0.73	1.47	12
Cathedral Bluffs located in NW¼, NW¼, Sec. 14, T2S, R100W	0.15	0.40	7	0.52	1.37	7	0.60	1.14	4

APPROXIMATE MONTHLY TOTAL (IN.)

Storage Type Rain Gage Locations	JANUARY	FEBRUARY	MARCH
Dry Fork near west line Tract C-a	No Data	No Data	No Data
Box Elder Gulch near west line Tract C-a	No Data	No Data	No Data
Corral Gulch near west line Tract C-a	Insufficient Data	Insufficient Data	0.58

TABLE 1.2-13
PRECIPITATION SUMMARY
(CONTINUED)
1976

Recording Type Rain Gage Locations	APRIL			MAY^1					
	Maximum	Total	Number of Days	Maximum	Total	Number of Days	Maximum	Total	Number of Days
Stake Springs Draw near confluence with Corral Gulch	0.30	0.93	11	0.32	0.86	8			
Yellow Creek near White River	0.30	0.95	10	0.19	0.59	9			
Cathedral Bluffs located in NW¼, NW¼, Sec. 14, T2S, R100W	0.57	1.82	8	0.28	0.94	8			

APPROXIMATE MONTHLY TOTAL (IN.)

Storage Type Rain Gage Locations	APRIL	MAY^2	
Dry Fork near west line Tract C-a	1.21	0.44	
Box Elder Gulch near west line Tract C-a	0.95	0.41	
Corral Gulch near west line Tract C-a	0.65	0.11	

[1] Through May 24, 1976

[2] Through May 17, 1976

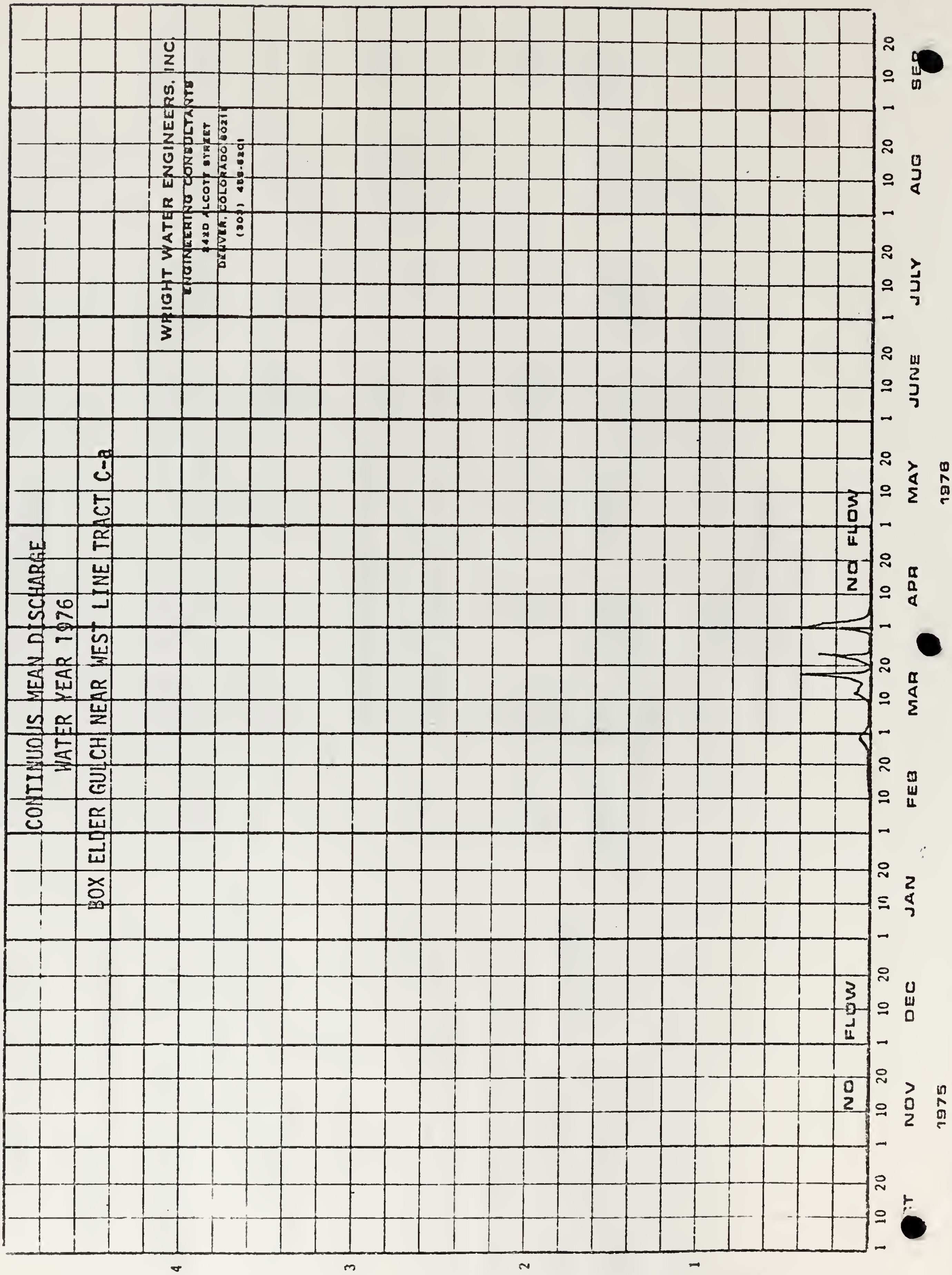

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
BOX ELDER GULCH NEAR WEST LINE TRACT C-a
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
NO FLOW
NO FLOW
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976
1 10 20
1
2
3
4
MEAN DISCHARGE CFS

Figure 1.2-2

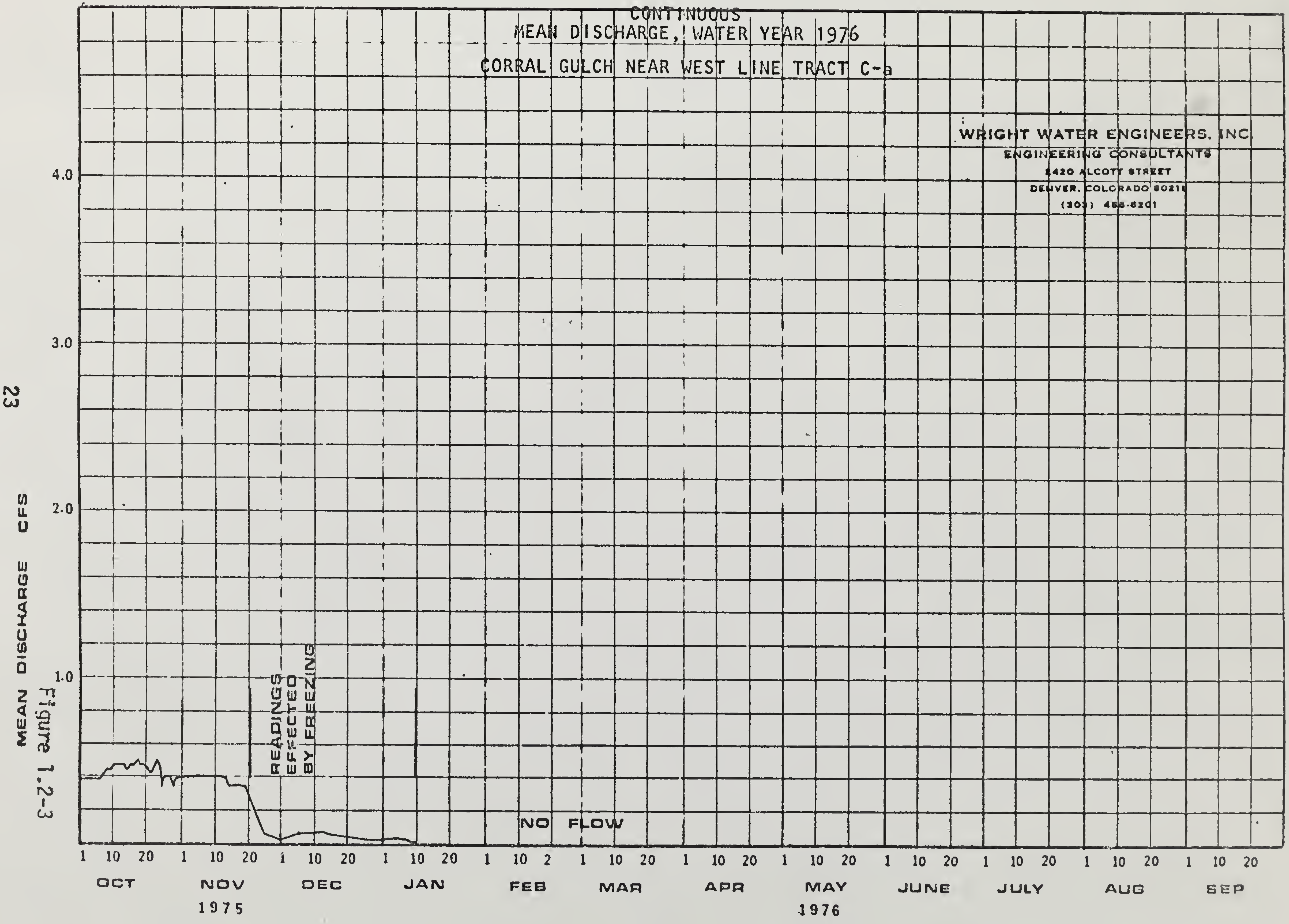

CONTINUOUS
MEAN DISCHARGE, WATER YEAR 1976
CORRAL GULCH NEAR WEST LINE TRACT C-a
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
READINGS EFFECTED BY FREEZING
NO FLOW
MEAN DISCHARGE CFS
4.0
3.0
2.0
1.0
1 10 20 OCT
1 10 20 NOV
1975
1 10 20 DEC
1 10 20 JAN
1 10 2 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1976
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEP

Figure 1.2-3

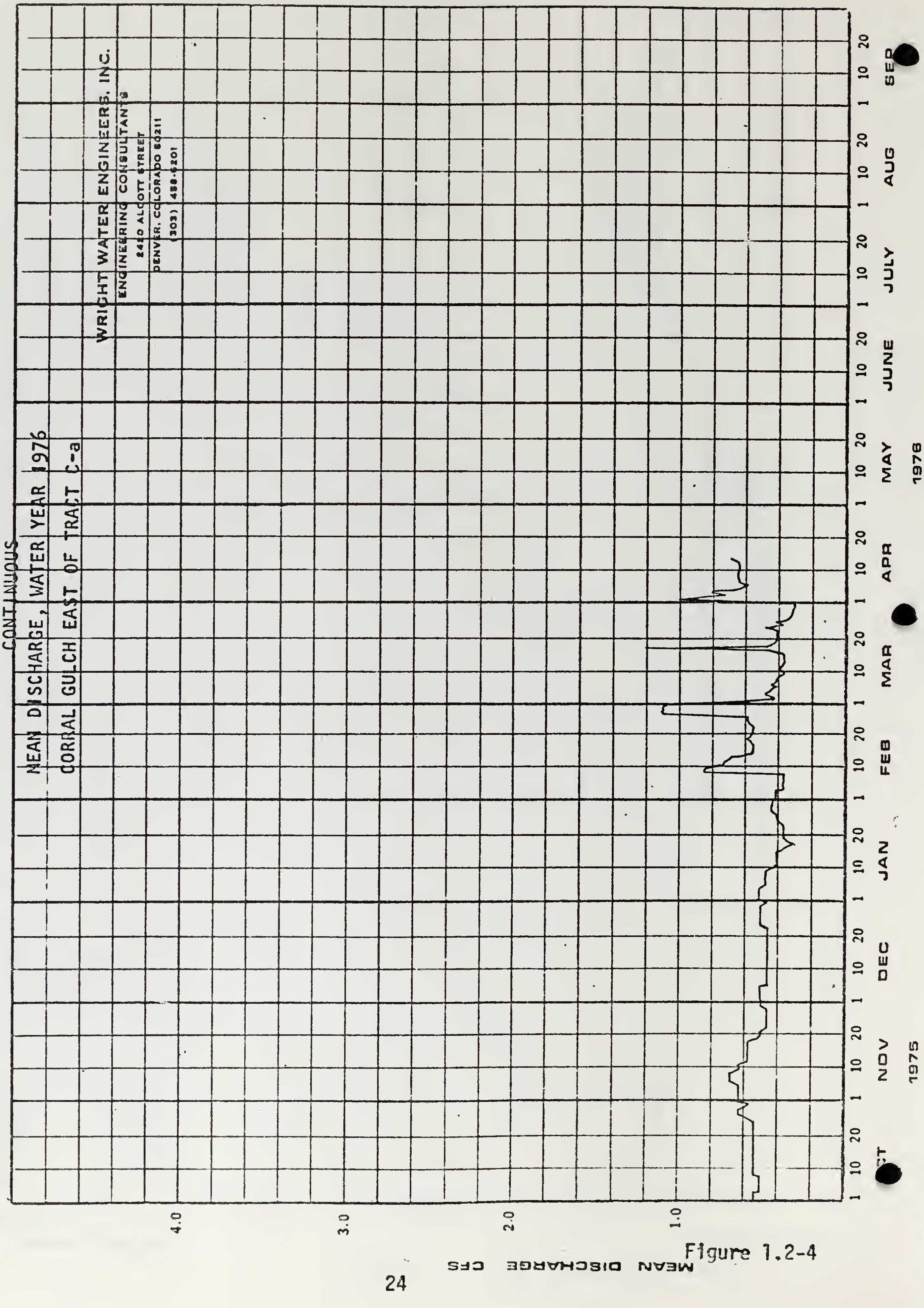

CONTINUOUS
MEAN DISCHARGE, WATER YEAR 1976
CORRAL GULCH EAST OF TRACT C-a
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-6201
4.0
3.0
2.0
1.0
MEAN DISCHARGE CFS
1 10 20
OCT
1 10 20
NOV
1975
1 10 20
DEC
1 10 20
JAN
1 10 20
FEB
1 10 20
MAR
1 10 20
APR
1 10 20
MAY
1976
1 10 20
JUNE
1 10 20
JULY
1 10 20
AUG
1 10 20
SEP

Figure 1.2-4

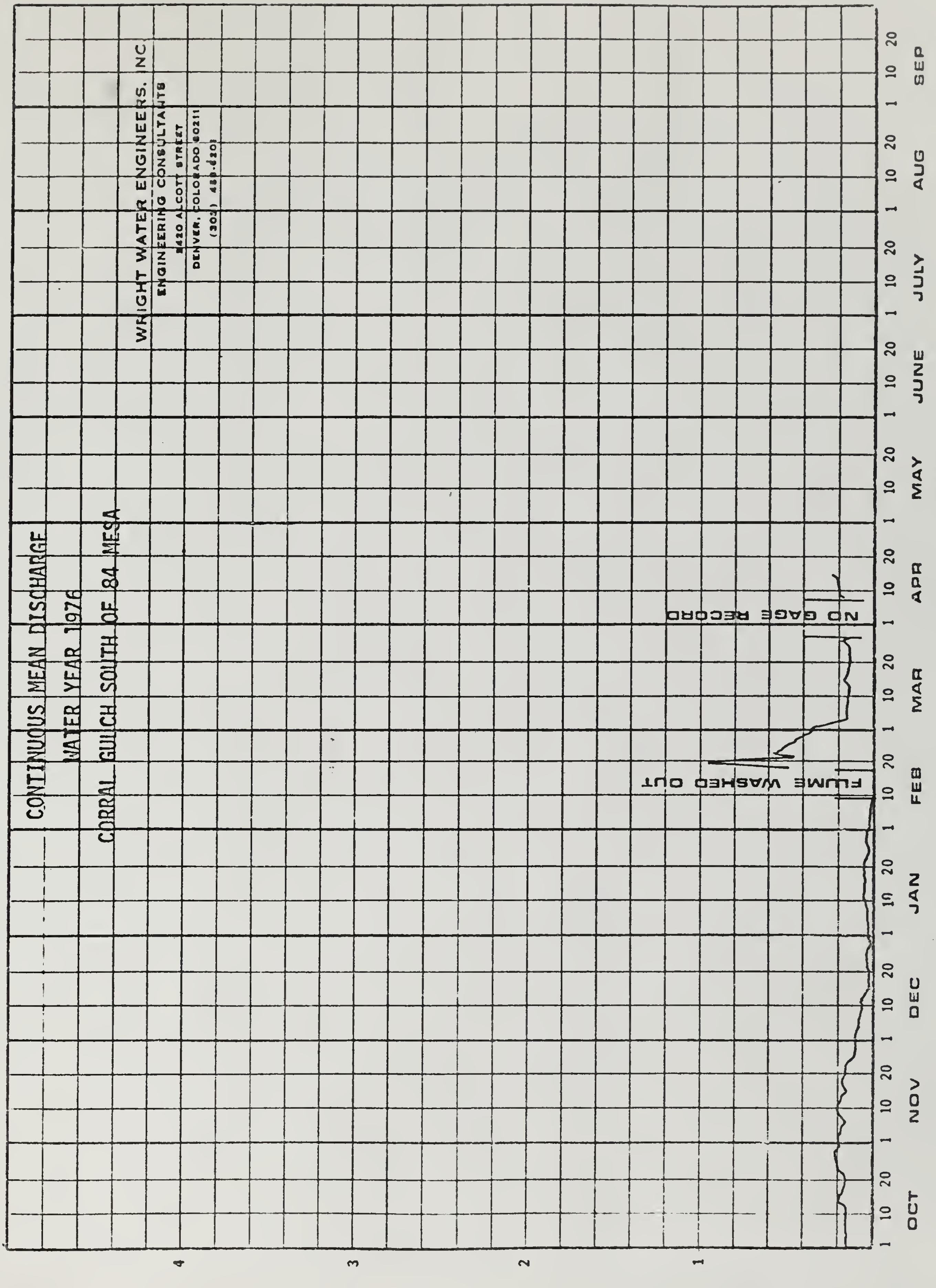

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
CORRAL GULCH SOUTH OF 84 MESA
WRIGHT WATER ENGINEERS, INC
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-1700
FLUME WASHED OUT
NO GAGE RECORD
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1 10 20
1975
1976
1
2
3
4
MEAN DISCHARGE CFS

Figure 1.2-5

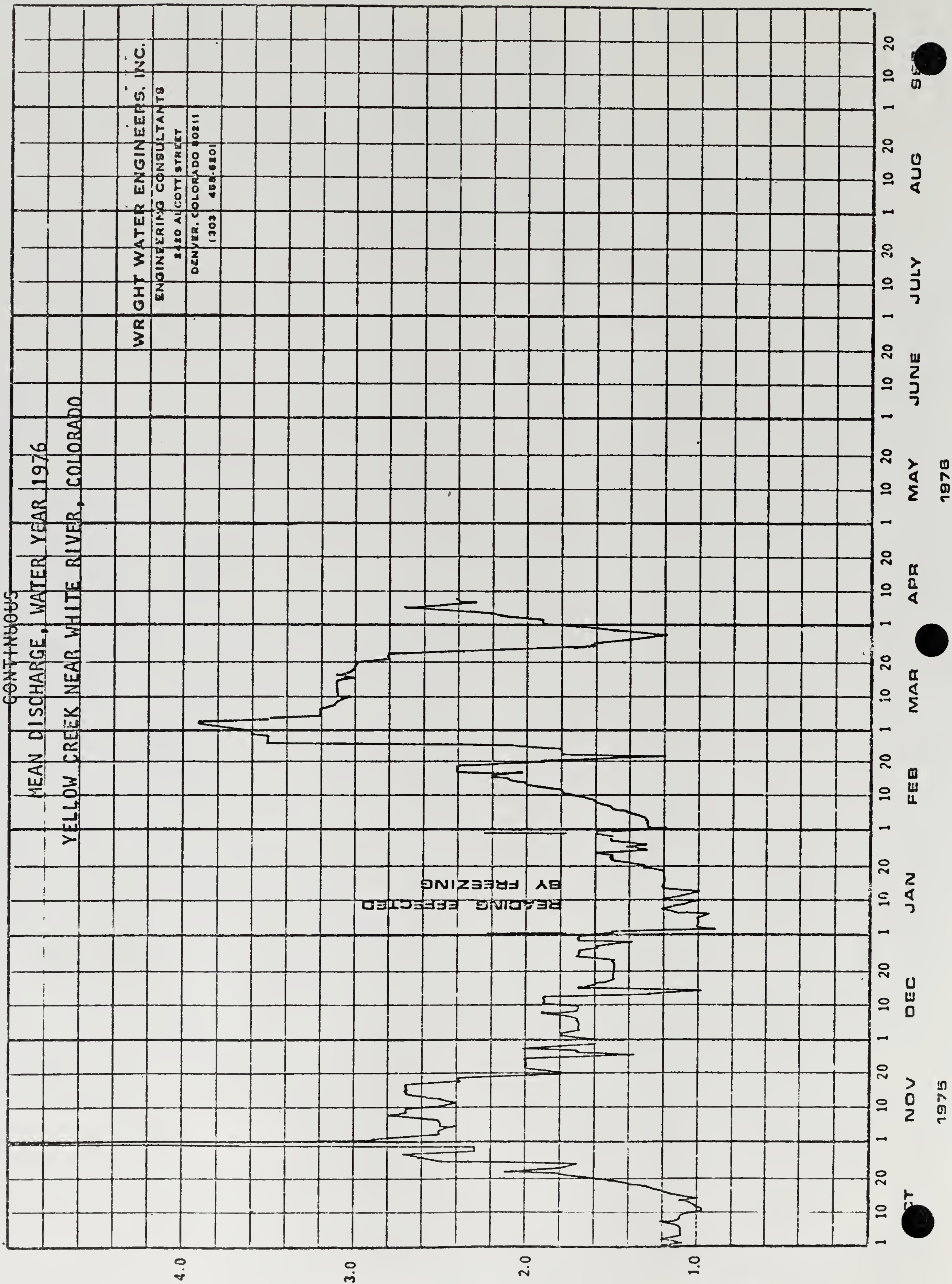

~~CONTINUOUS~~
MEAN DISCHARGE, WATER YEAR 1976
YELLOW CREEK NEAR WHITE RIVER, COLORADO
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
READING EFFECTED BY FREEZING
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1 10 20
1975
1976
1.0
2.0
3.0
4.0
MEAN DISCHARGE CFS

Figure 1.2-6

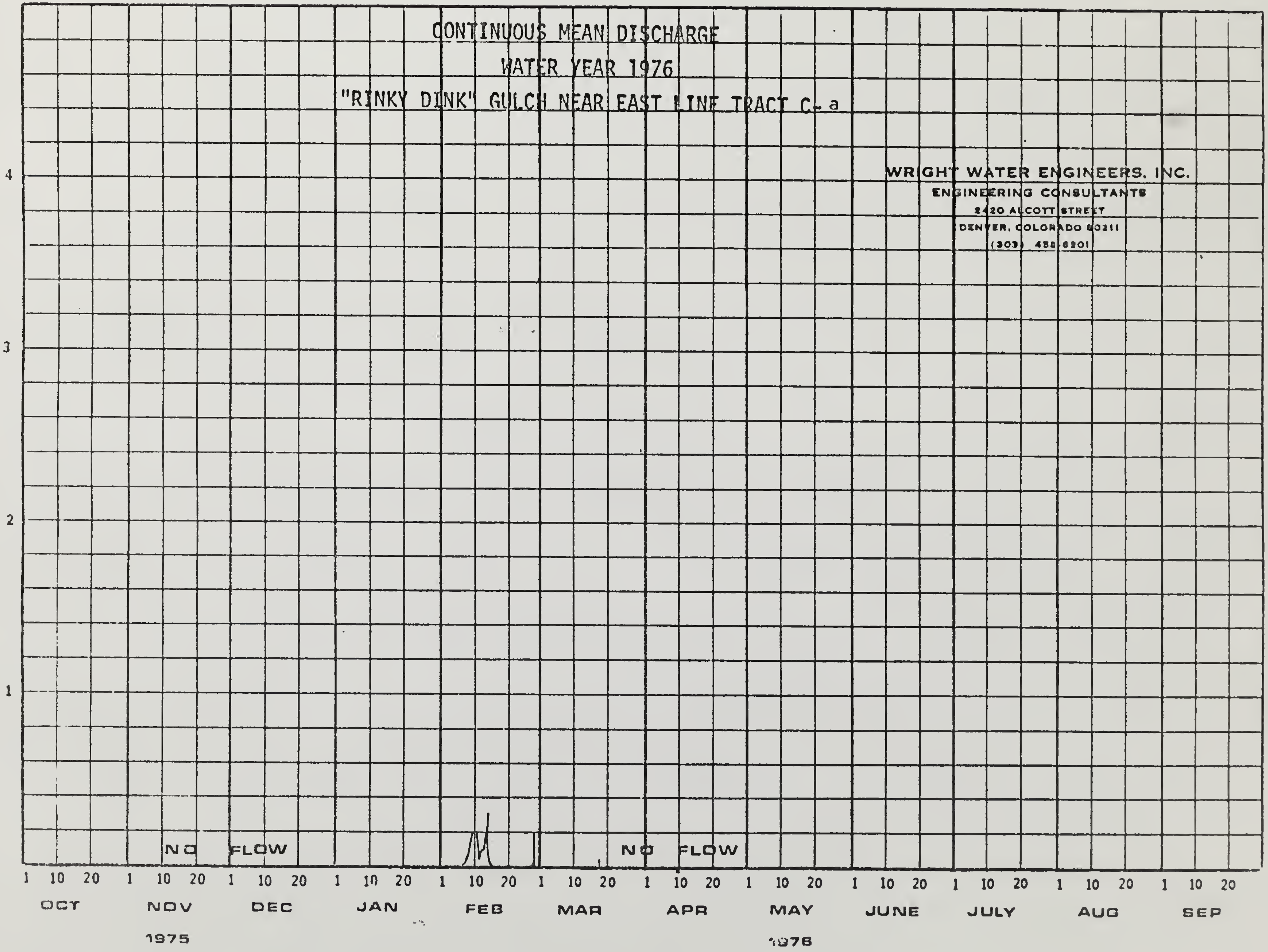

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
"RINKY DINK" GULCH NEAR EAST LINE TRACT C- a
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
MEAN DISCHARGE CFS
4
3
2
1
NO FLOW
NO FLOW
1 10 20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-7

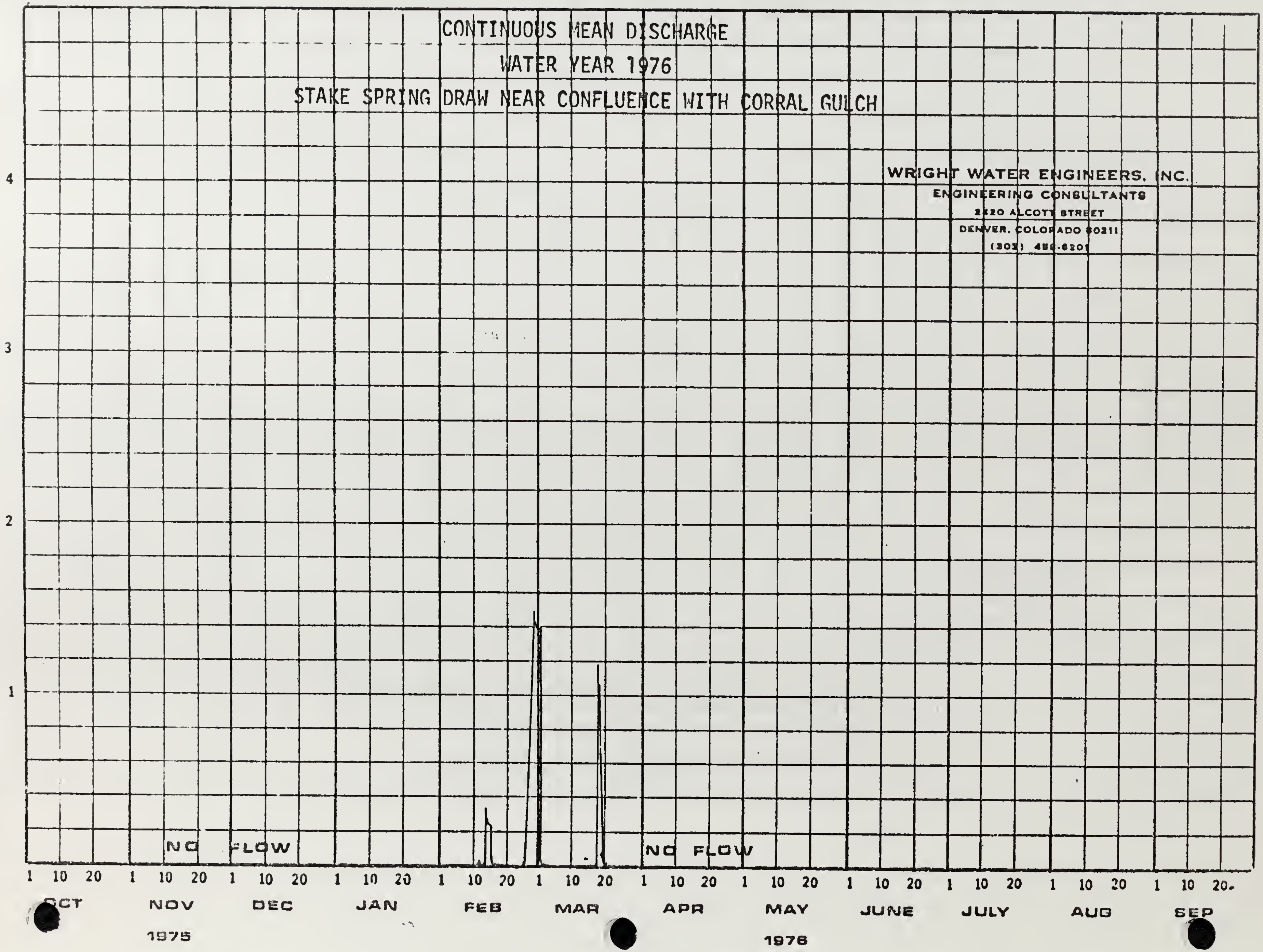

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
STAKE SPRING DRAW NEAR CONFLUENCE WITH CORRAL GULCH
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-6201
MEAN DISCHARGE CFS
4
3
2
1
NO FLOW
NO FLOW
1 10 20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-8

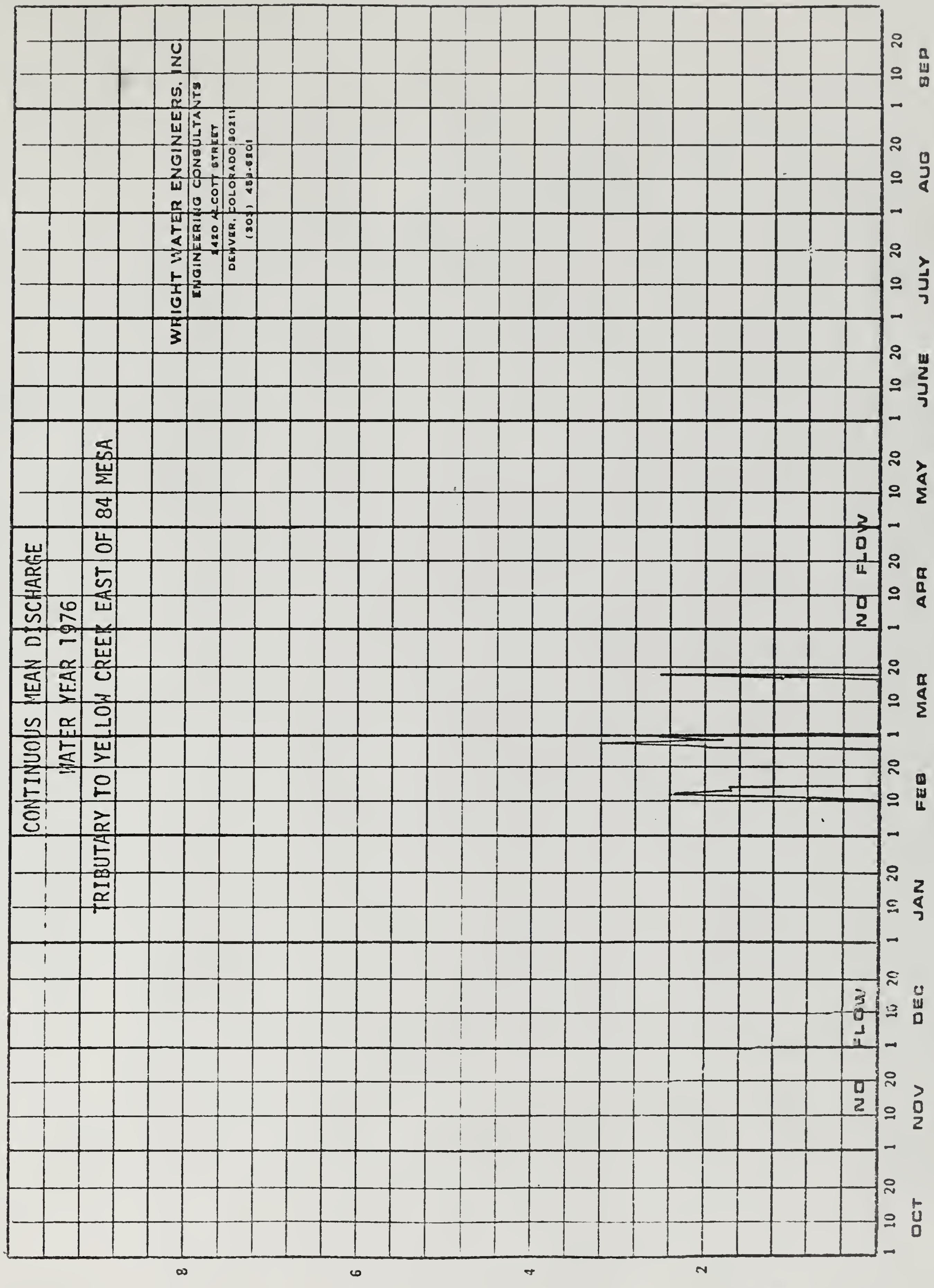

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
TRIBUTARY TO YELLOW CREEK EAST OF 84 MESA
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
NO FLOW
NO FLOW
8
6
4
2
MEAN DISCHARGE CFS
1 10 20 OCT
1 10 20 NOV
1 10 20 DEC
1 10 20 JAN
1 10 20 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEP
1975
1976

Figure 1.2-9

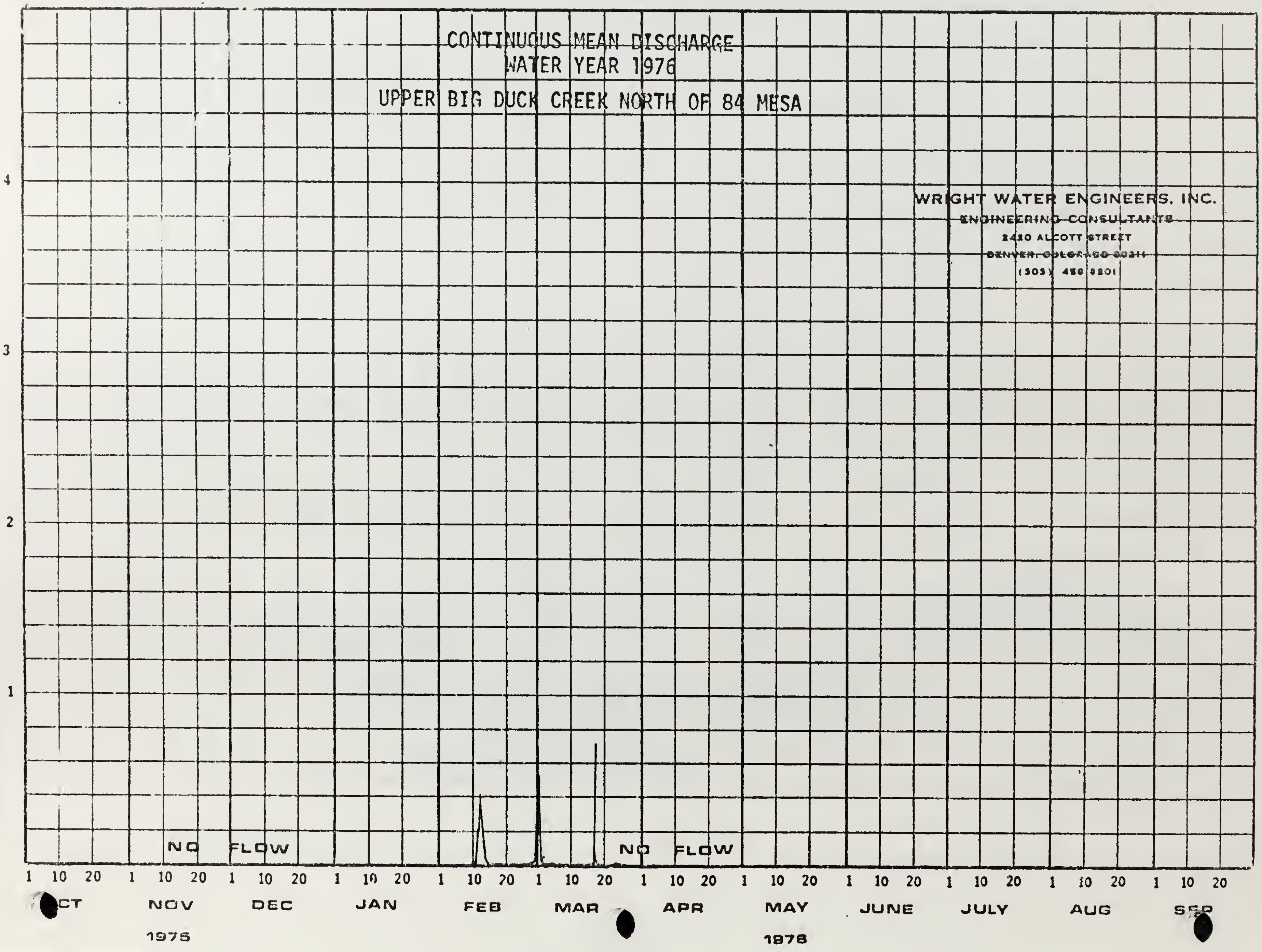

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
UPPER BIG DUCK CREEK NORTH OF 84 MESA
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480 1201
MEAN DISCHARGE CFS
4
3
2
1
NO FLOW
NO FLOW
1 10 20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-10

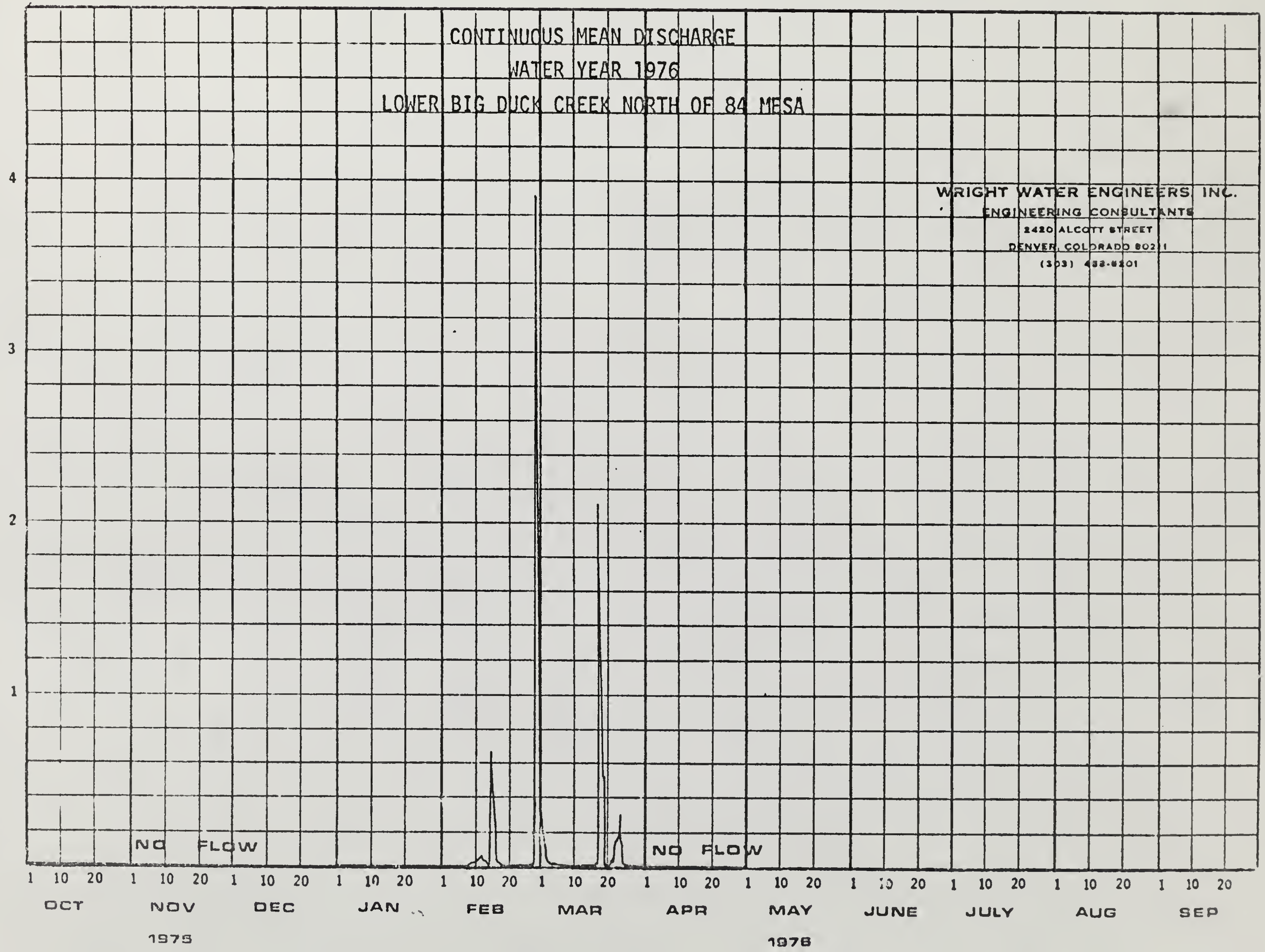

CONTINUOUS MEAN DISCHARGE
WATER YEAR 1976
LOWER BIG DUCK CREEK NORTH OF 84 MESA
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 433-8201
NO FLOW
NO FLOW
4
3
2
1
MEAN DISCHARGE CFS
1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-11

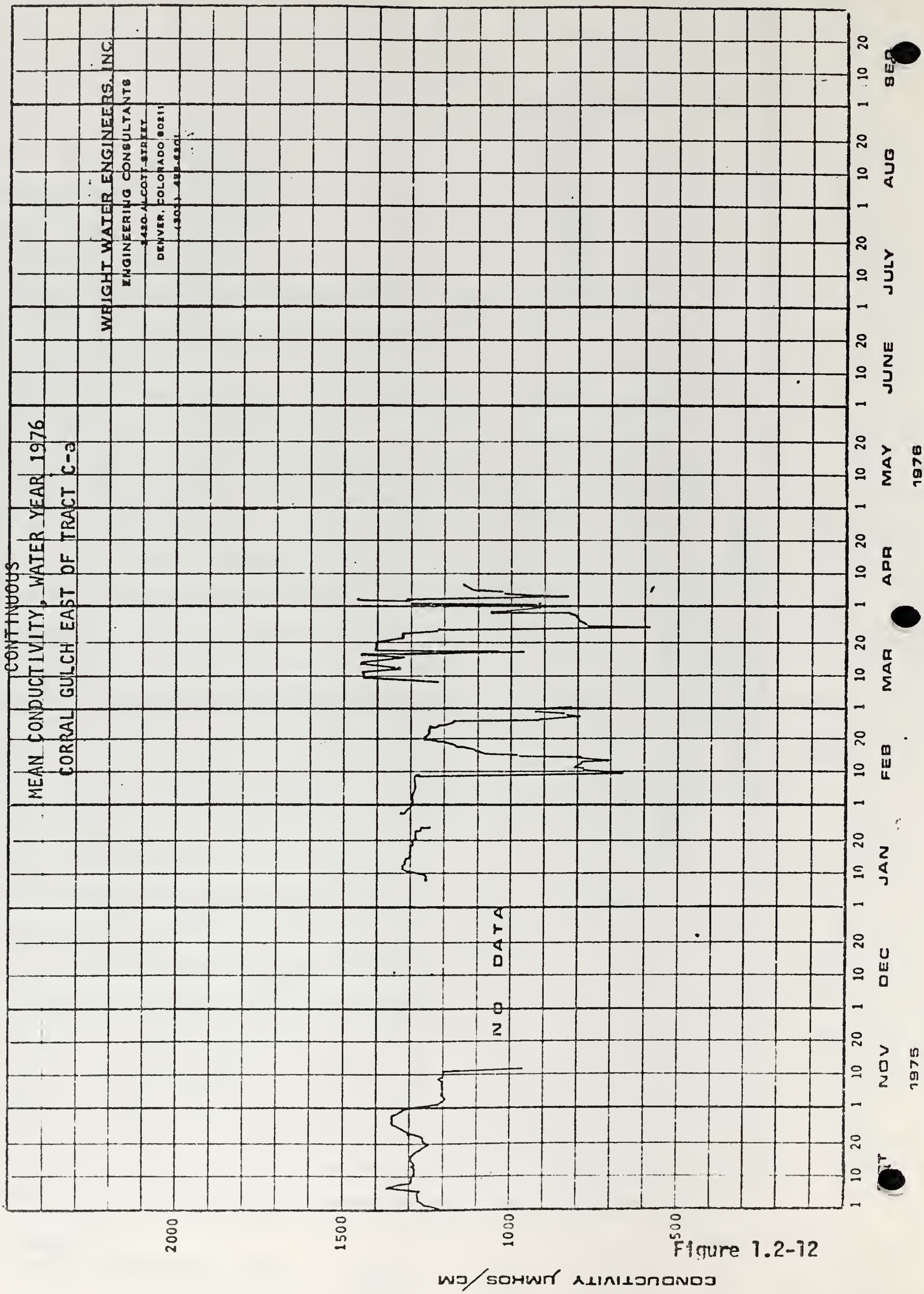
CONTINUOUS
MEAN CONDUCTIVITY, WATER YEAR 1976
CORRAL GULCH EAST OF TRACT C-a
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
NO DATA
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1
10
20
1975
1976
2000
1500
1000
500
CONDUCTIVITY µMHOS/CM

Figure 1.2-12

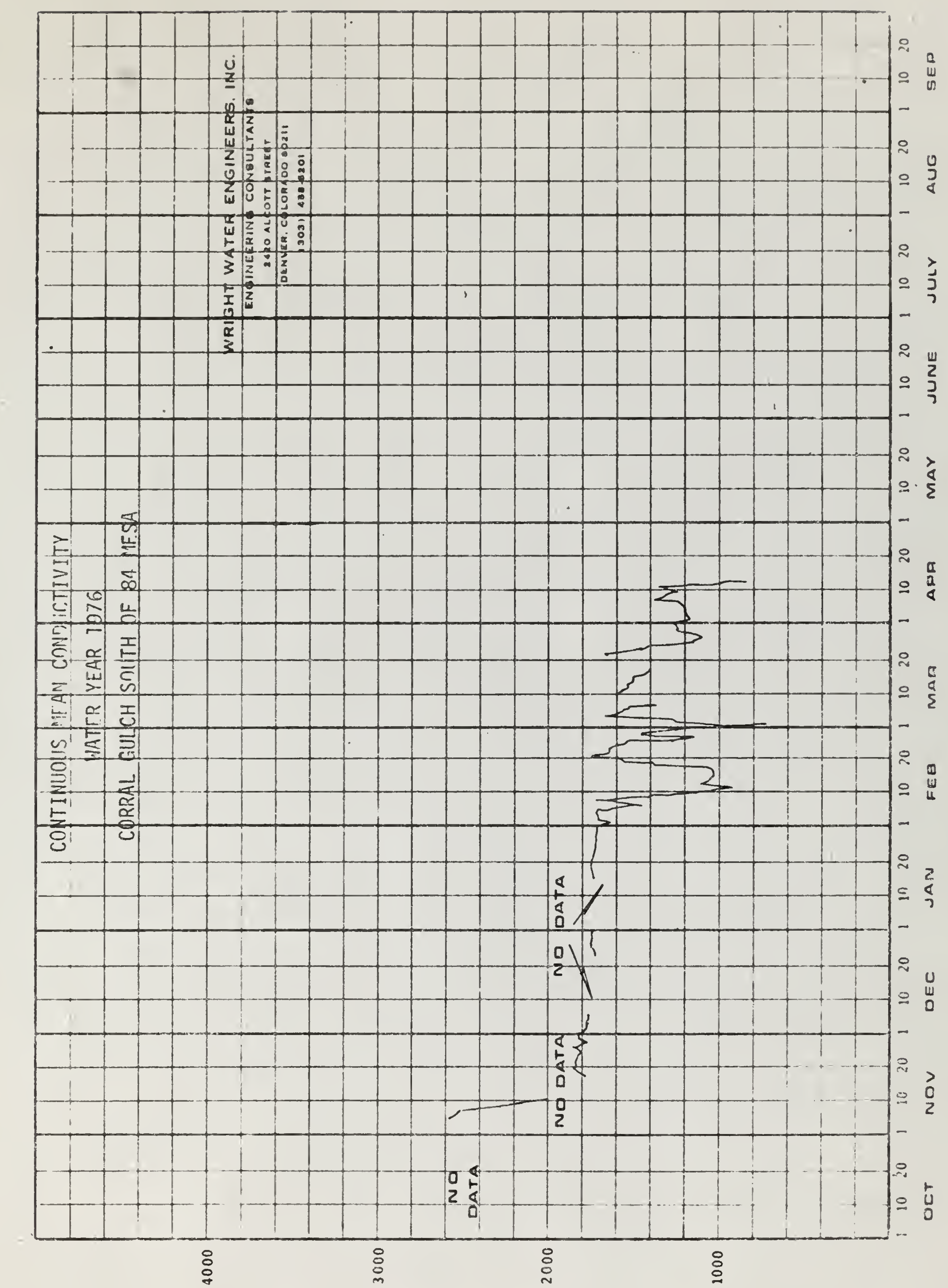
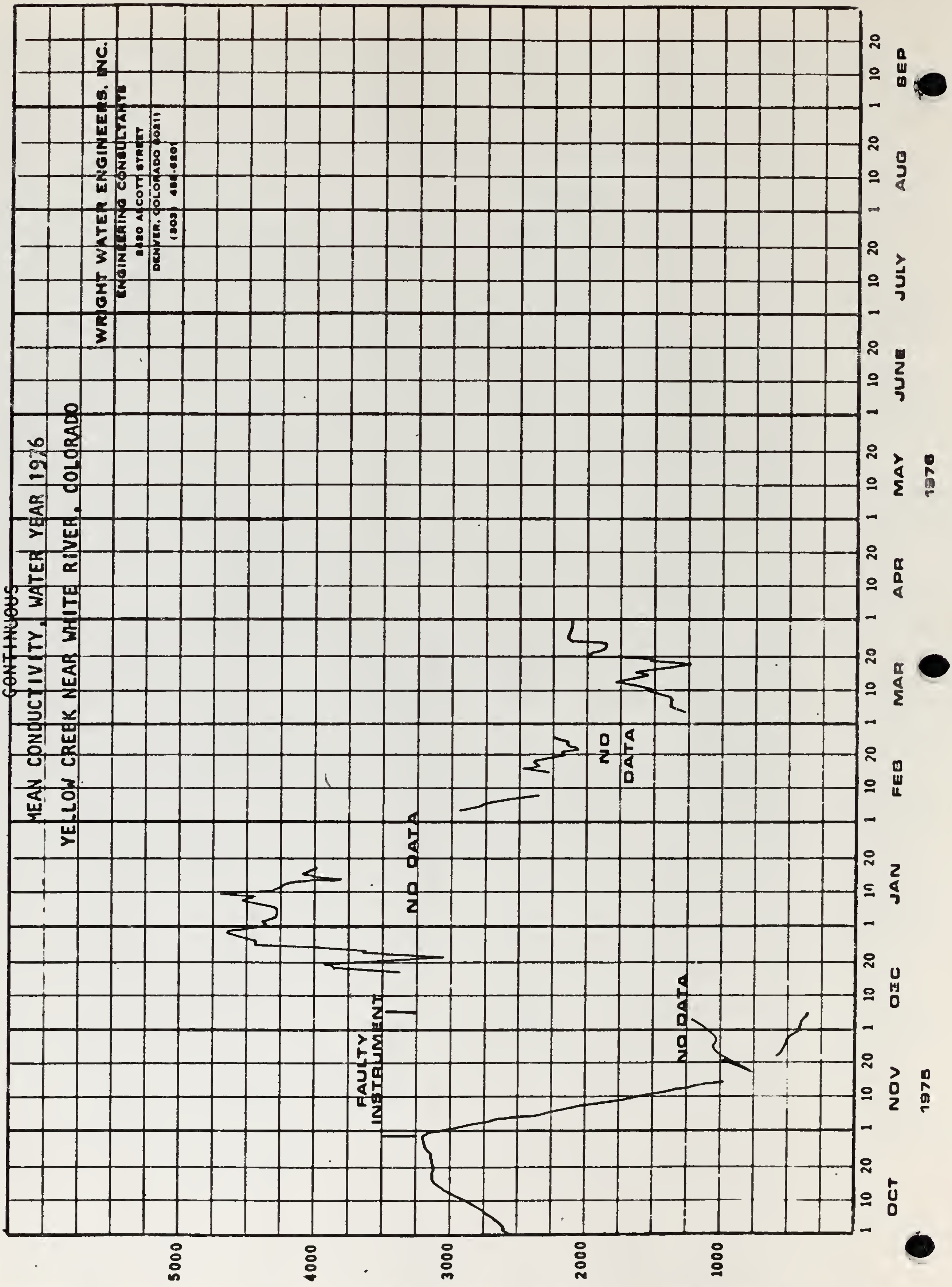

CONTINUOUS MEAN CONDUCTIVITY
WATER YEAR 1976
CORRAL GULCH SOUTH OF 84 MESA
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-8201
NO DATA
NO DATA
NO DATA
NO DATA
4000
3000
2000
1000
MEAN CONDUCTIVITY µMHOS/CM
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1 10 20
1975
1976

Figure 1.2-13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MEAN CONDUCTIVITY, WATER YEAR 1976
YELLOW CREEK NEAR WHITE RIVER, COLORADO
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2490 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-1700
FAULTY INSTRUMENT
NO DATA
NO DATA
NO DATA
5000
4000
3000
2000
1000
MEAN CONDUCTIVITY μMHOS/CM
1
10
20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-14

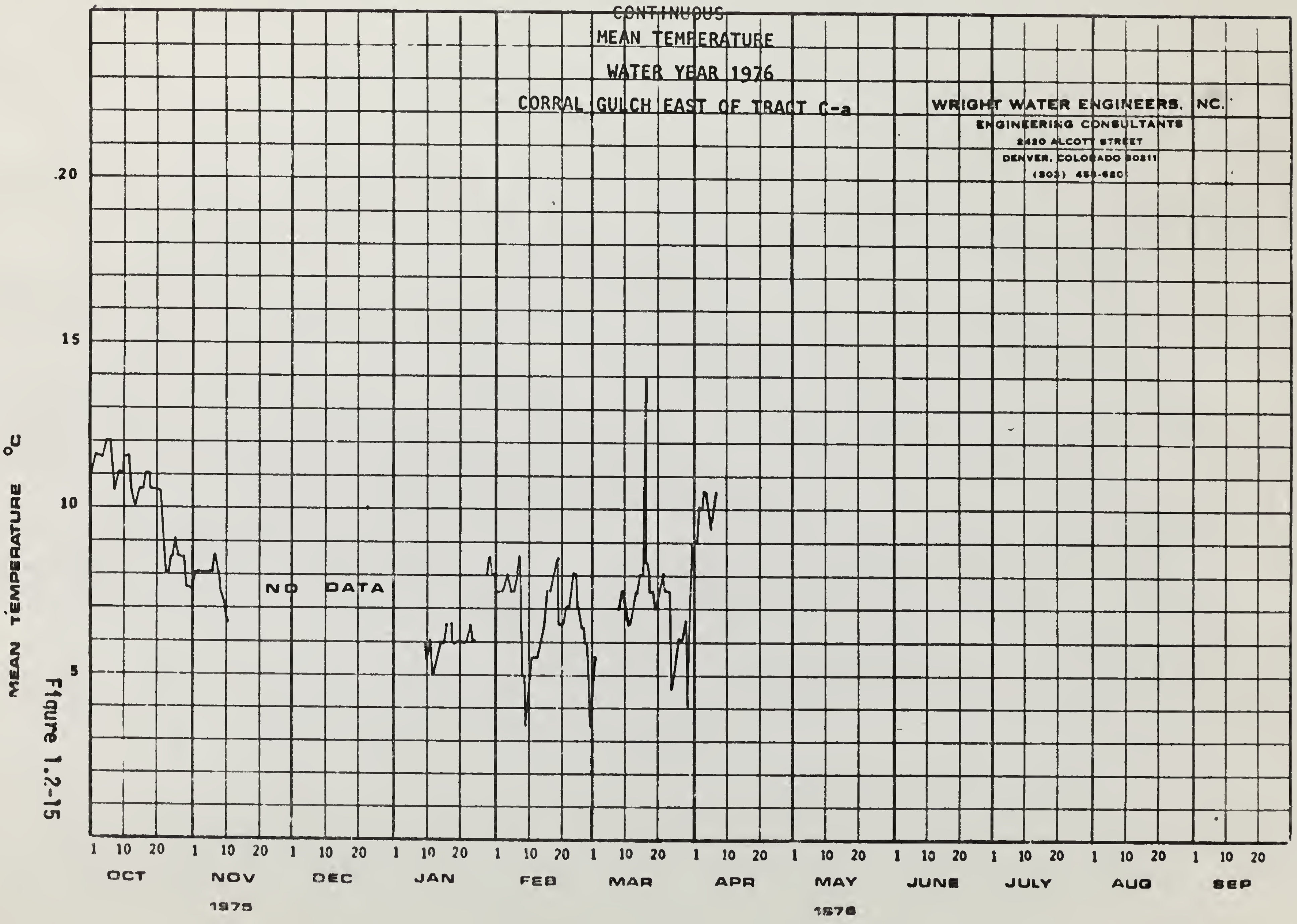
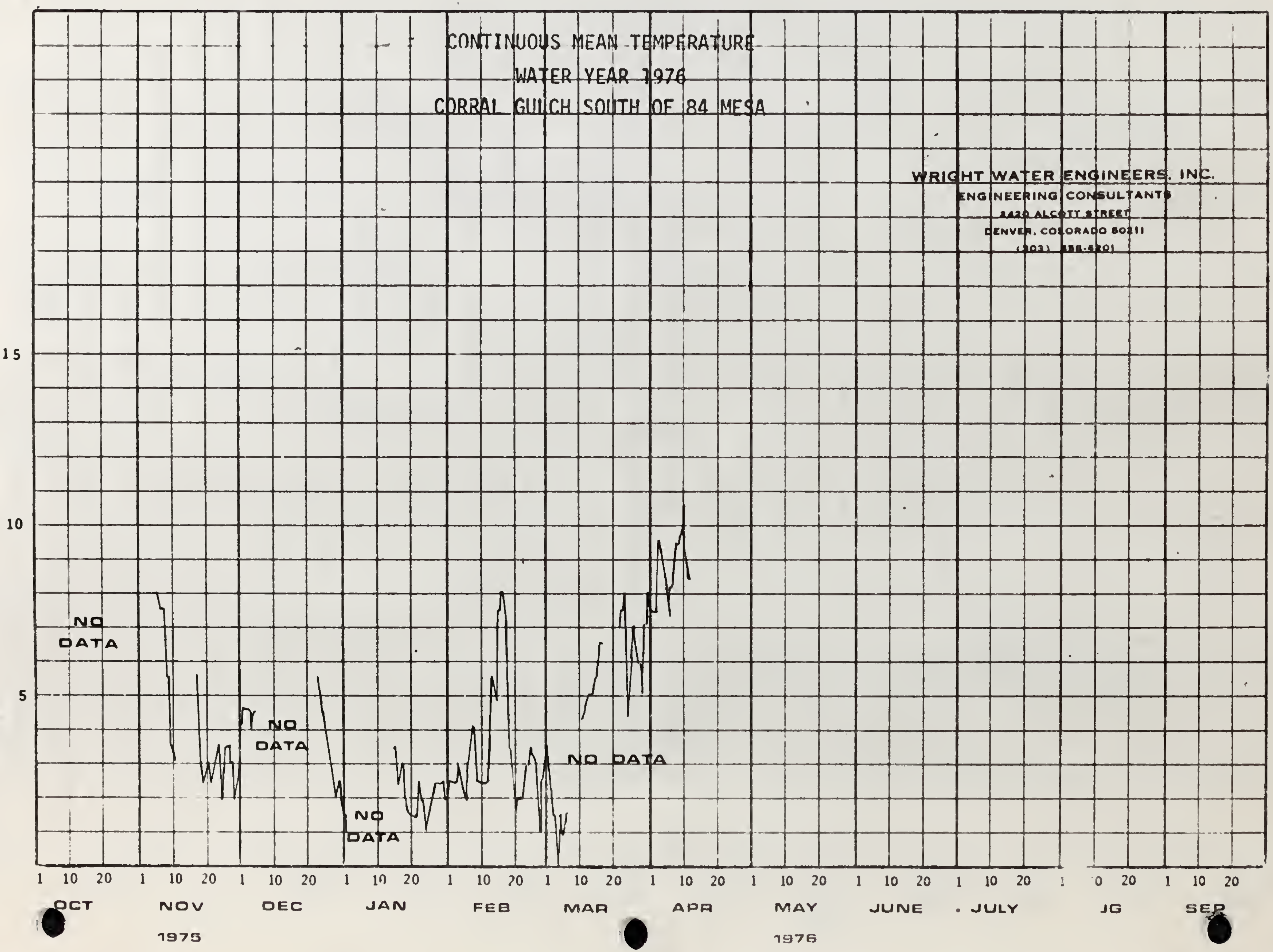

~~CONTINUOUS~~
MEAN TEMPERATURE
WATER YEAR 1976
CORRAL GULCH EAST OF TRACT C-a
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-620
NO DATA
.20
15
10
5
MEAN TEMPERATURE °C
1 10 20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-15



CONTINUOUS MEAN TEMPERATURE
WATER YEAR 1976
CORRAL GULCH SOUTH OF 84 MESA

Figure 1.2-16

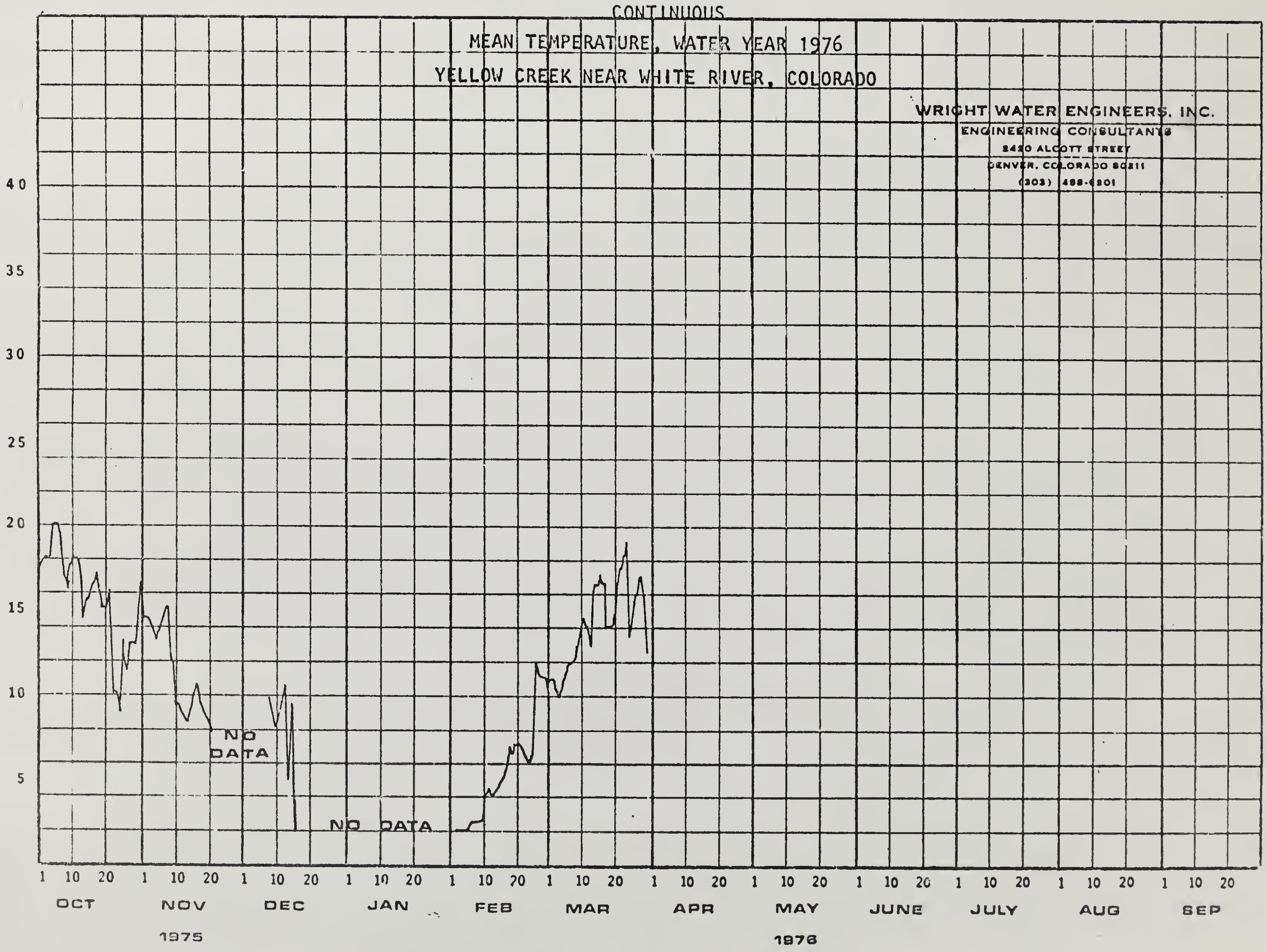
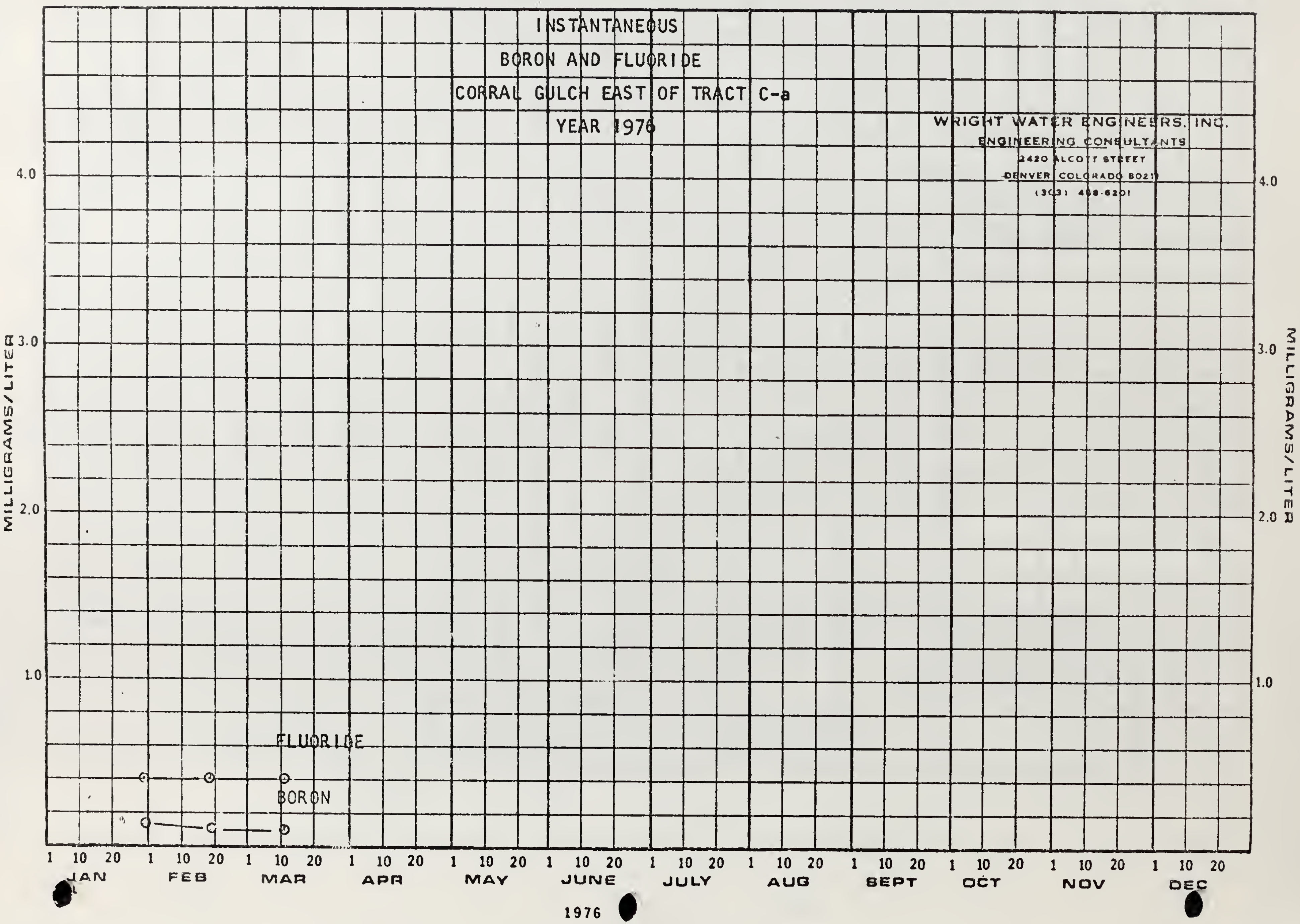

CONTINUOUS
MEAN TEMPERATURE, WATER YEAR 1976
YELLOW CREEK NEAR WHITE RIVER, COLORADO
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 488-6201
MEAN TEMPERATURE °C
40
35
30
25
20
15
10
5
NO DATA
NO DATA
1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
1975
1976

Figure 1.2-17



INSTANTANEOUS
BORON AND FLUORIDE
CORRAL GULCH EAST OF TRACT C-a
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
MILLIGRAMS/LITER
4.0
3.0
2.0
1.0
FLUORIDE
BORON
1 10 20 JAN
1 10 20 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEPT
1 10 20 OCT
1 10 20 NOV
1 10 20 DEC
1976

Figure 1.2-18

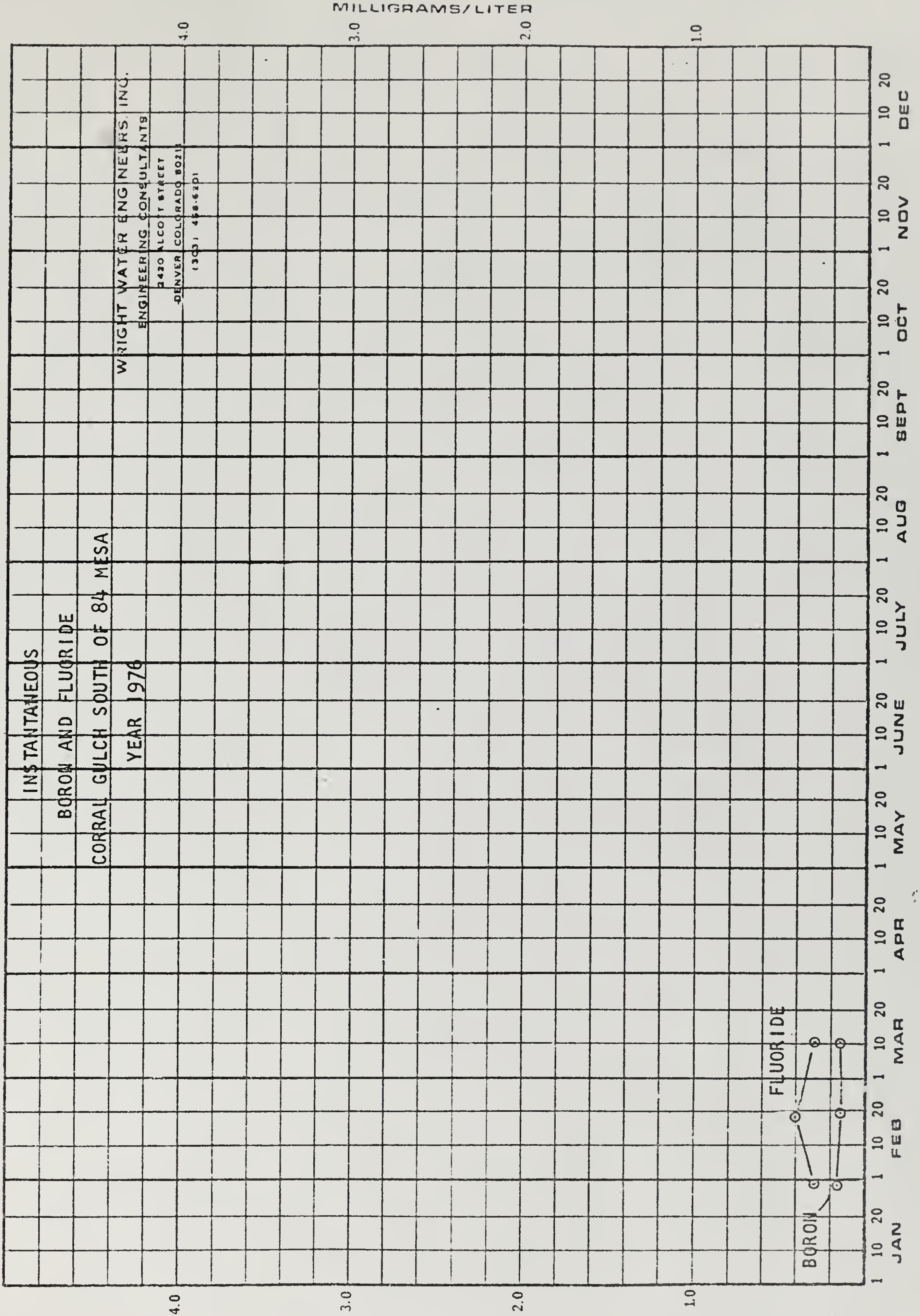
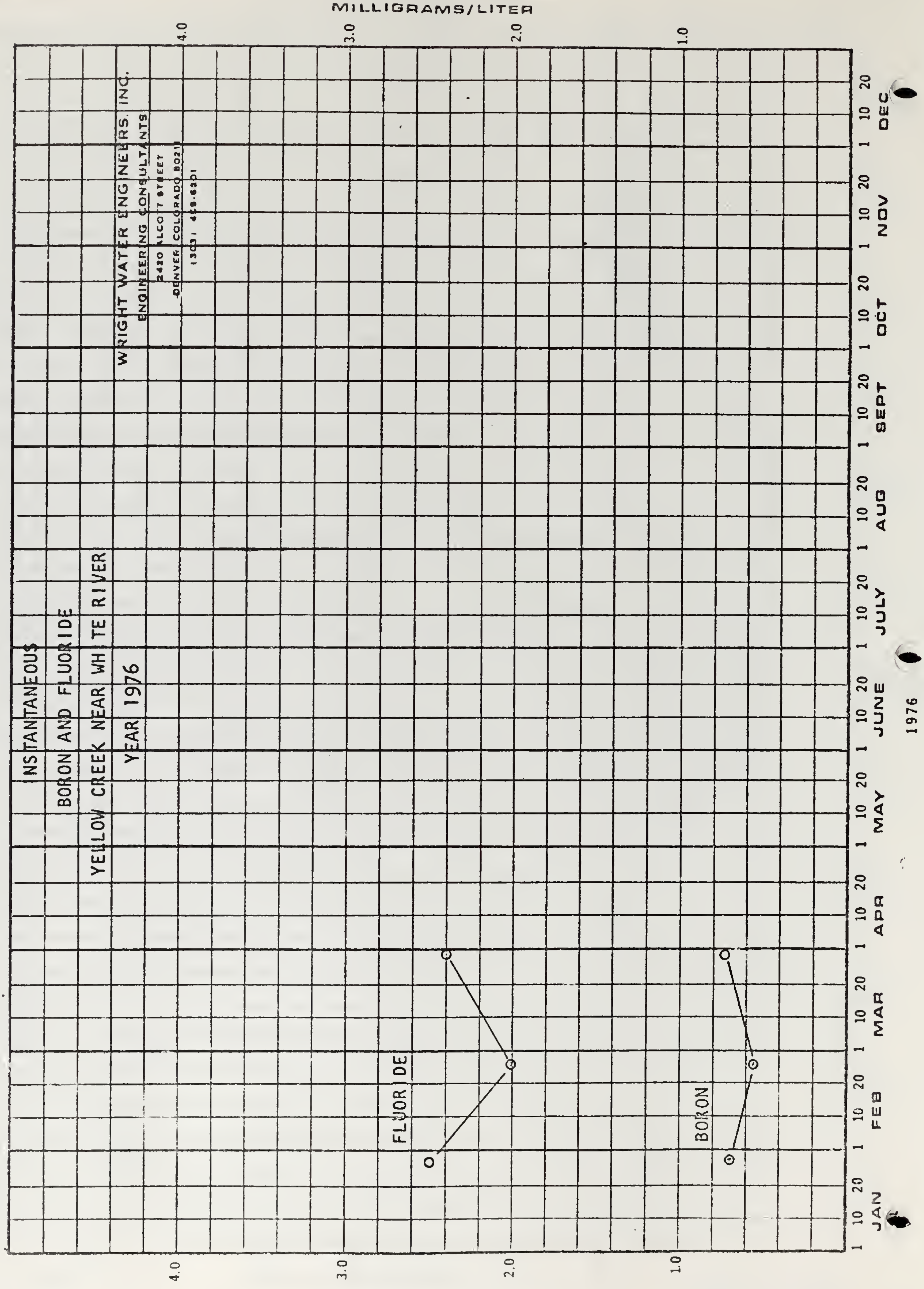

INSTANTANEOUS
BORON AND FLUORIDE
CORRAL GULCH SOUTH OF 84 MESA
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
FLUORIDE
BORON
MILLIGRAMS/LITER
4.0
3.0
2.0
1.0
1 10 20 JAN
1 10 20 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEPT
1 10 20 OCT
1 10 20 NOV
1 10 20 DEC
1976

Figure 1.2-19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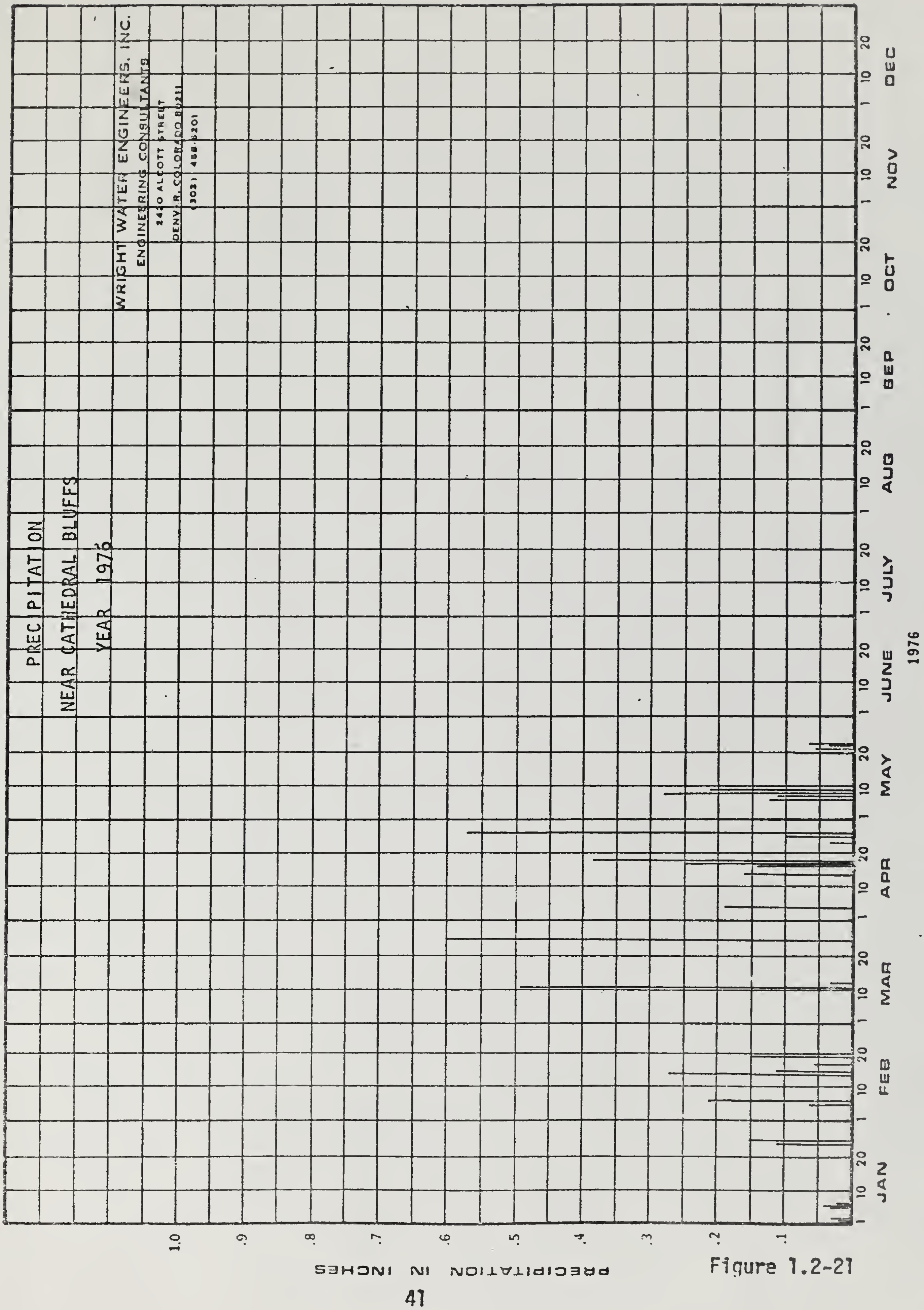
BORON AND FLUORIDE
YELLOW CREEK NEAR WHITE RIVER
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
MILLIGRAMS/LITER
4.0
3.0
2.0
1.0
FLUORIDE
BORON
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1 10 20
1976

Figure 1.2.20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NEAR CATHEDRAL BLUFFS
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2490 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
PRECIPITATION IN INCHES
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-21

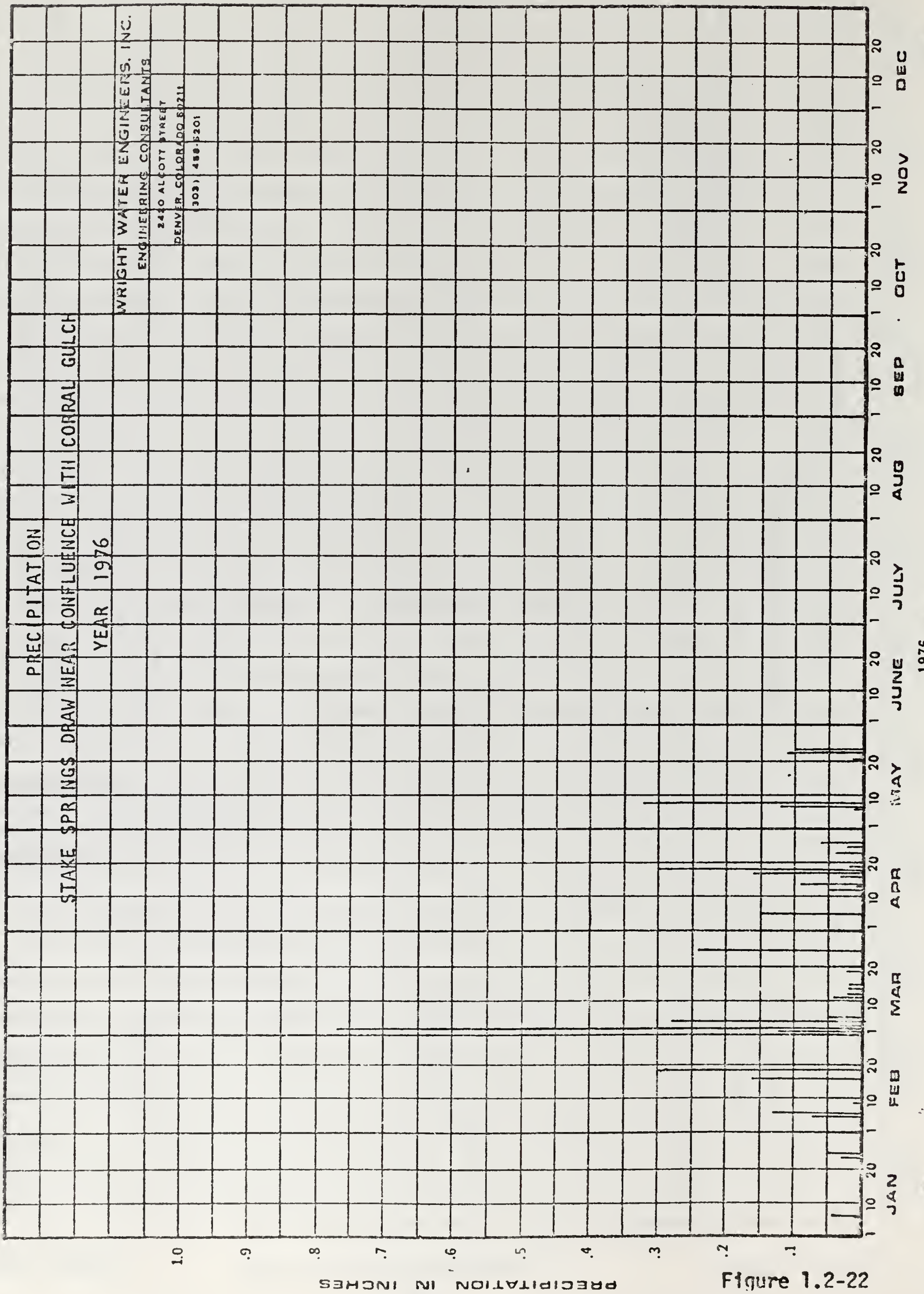

PRECIPITATION
STAKE SPRINGS DRAW NEAR CONFLUENCE WITH CORRAL GULCH
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
PRECIPITATION IN INCHES
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-22

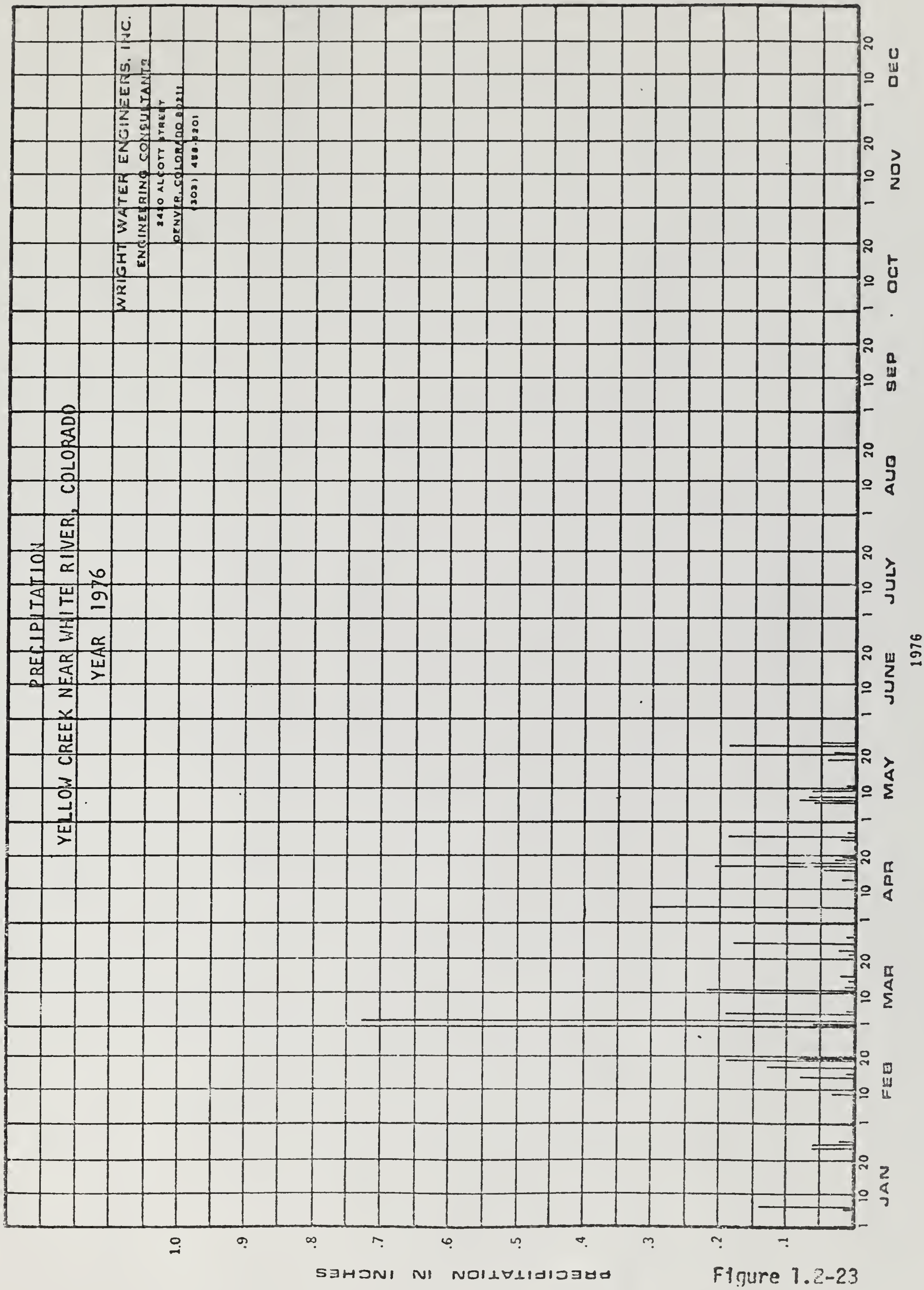

PRECIPITATION
YELLOW CREEK NEAR WHITE RIVER, COLORADO
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-1700
PRECIPITATION IN INCHES
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1 10 20
1976

Figure 1.2-23

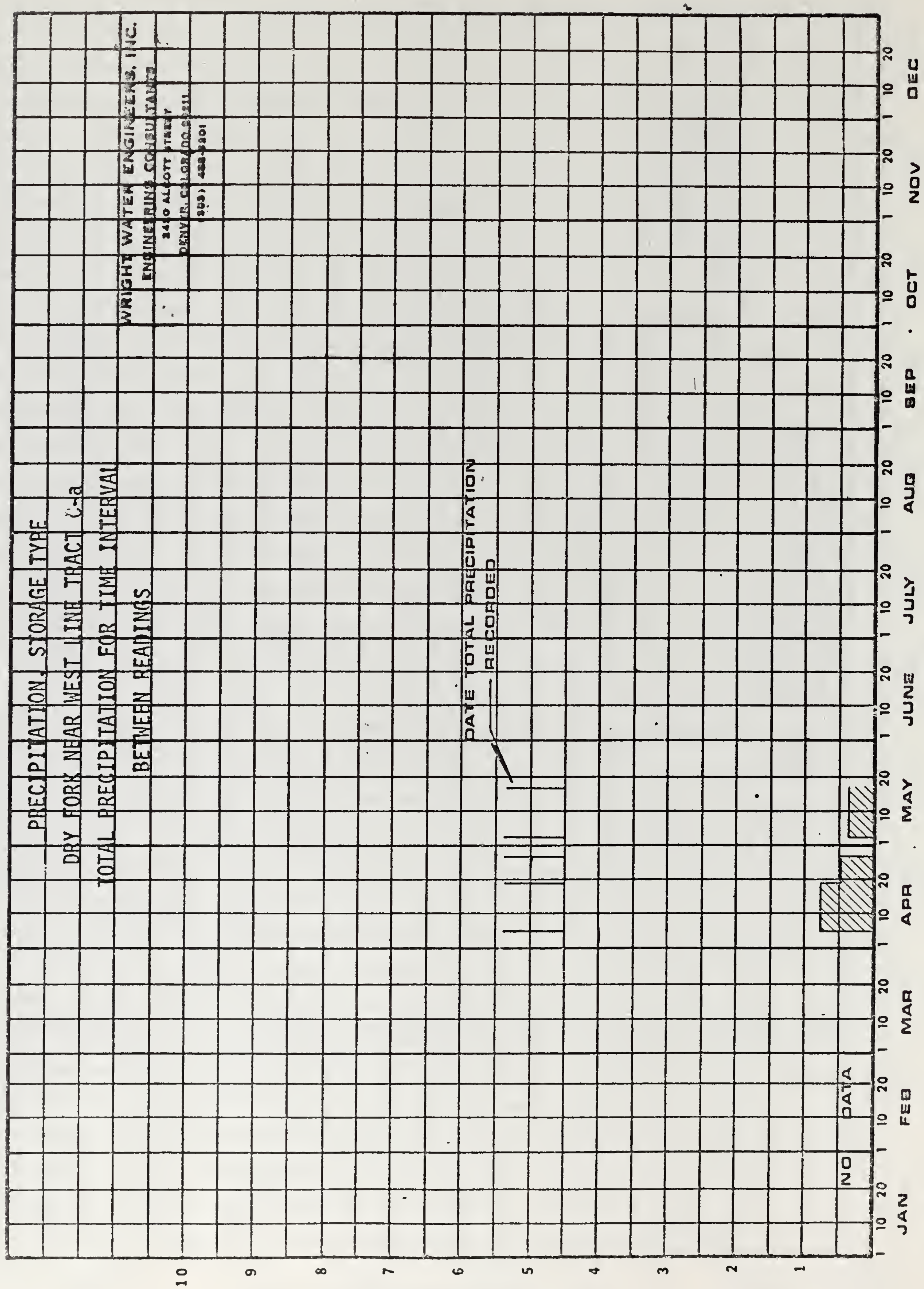

PRECIPITATION, STORAGE TYPE
DRY FORK NEAR WEST LINE TRACT C-a
TOTAL PRECIPITATION FOR TIME INTERVAL BETWEEN READINGS
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
DATE TOTAL PRECIPITATION RECORDED
NO DATA
10
9
8
7
6
5
4
3
2
1
PRECIPITATION IN INCHES
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-24

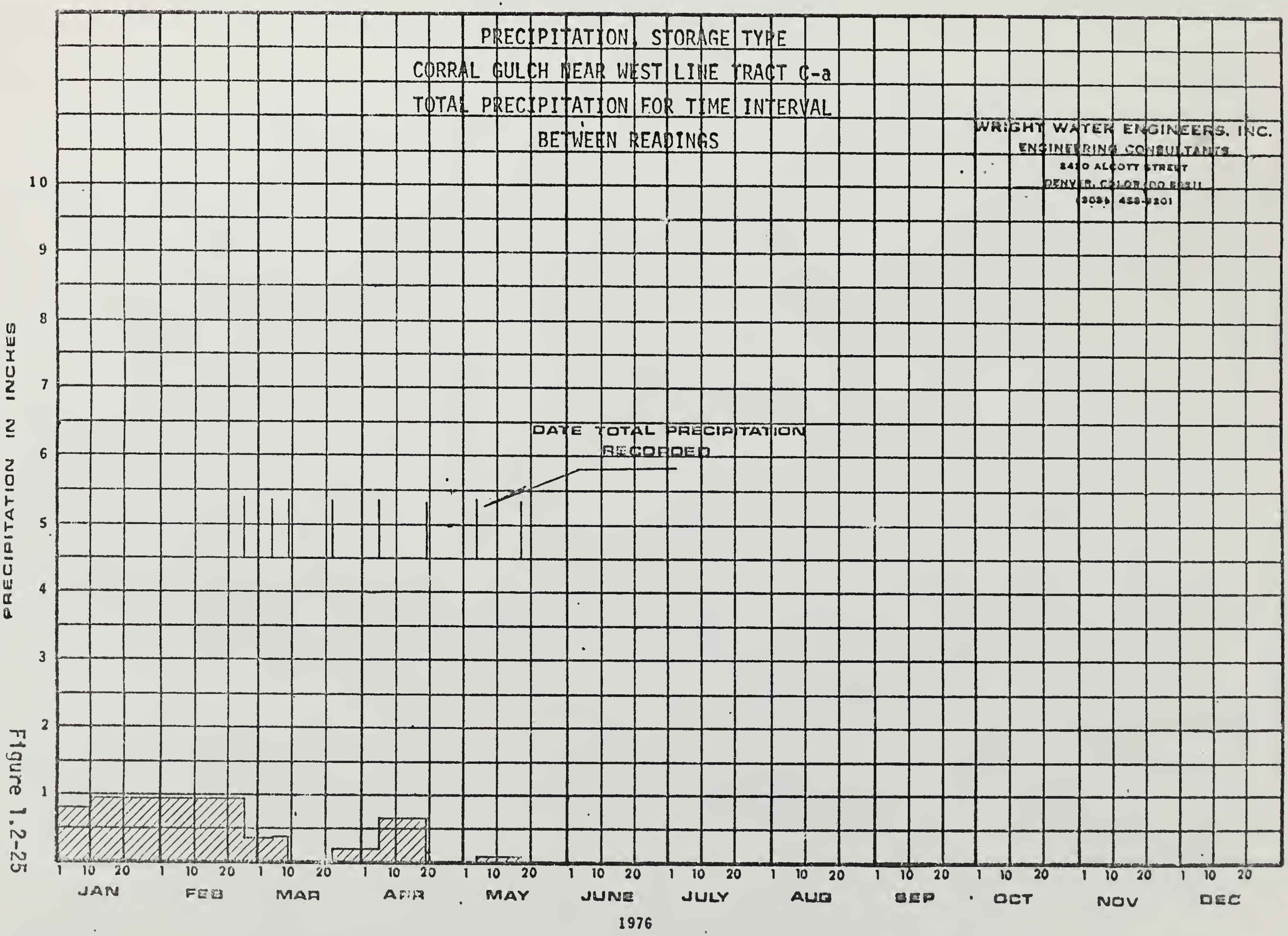

PRECIPITATION, STORAGE TYPE
CORRAL GULCH NEAR WEST LINE TRACT C-a
TOTAL PRECIPITATION FOR TIME INTERVAL
BETWEEN READINGS
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
DATE TOTAL PRECIPITATION RECORDED
PRECIPITATION IN INCHES
10
9
8
7
6
5
4
3
2
1
1 10 20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1976

Figure 1.2-25

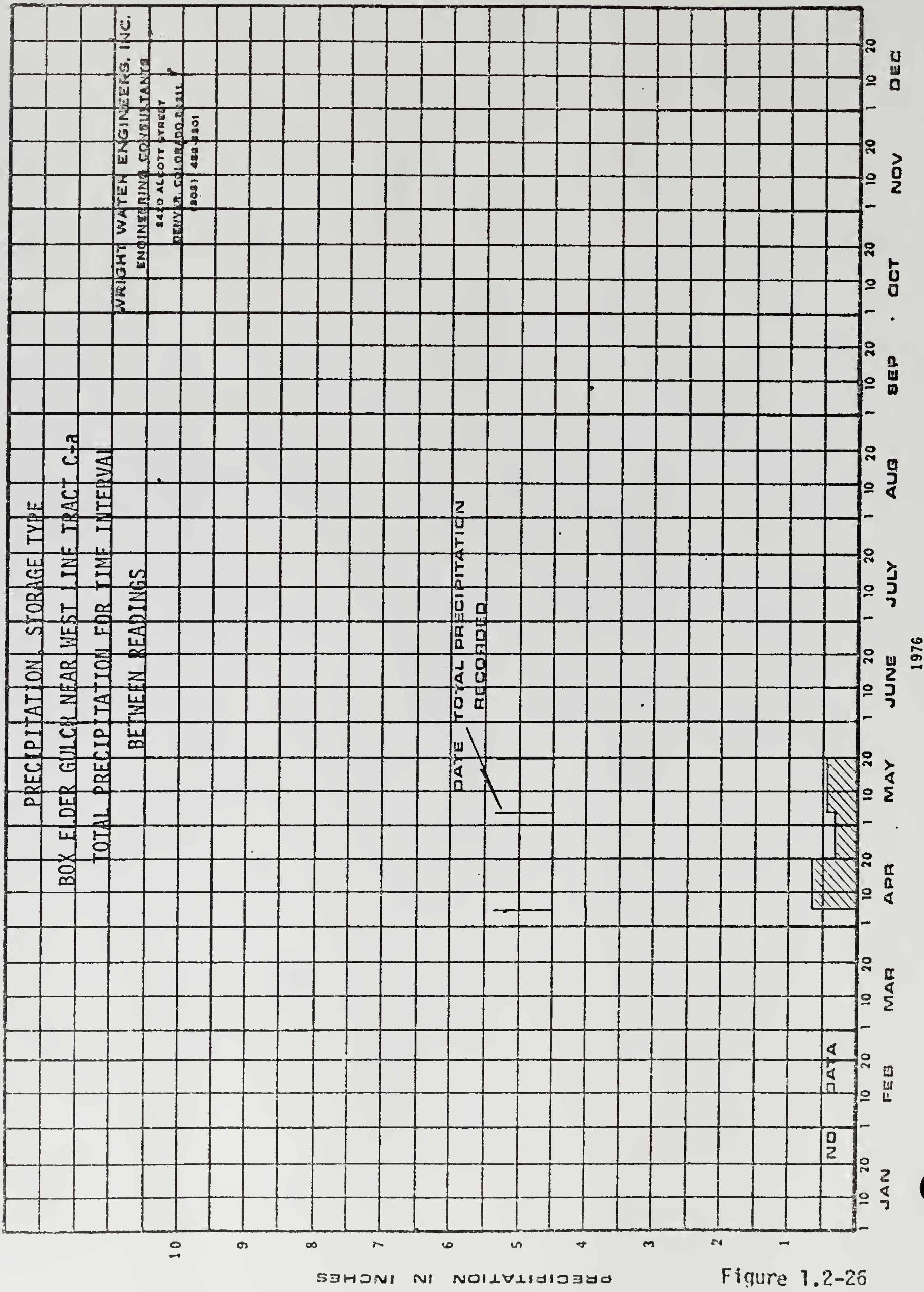

PRECIPITATION, STORAGE TYPE
BOX ELDER GULCH NEAR WEST LINE TRACT C-a
TOTAL PRECIPITATION FOR TIME INTERVAL
BETWEEN READINGS
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-1700
DATE
TOTAL PRECIPITATION
RECORDED
NO DATA
PRECIPITATION IN INCHES
10
9
8
7
6
5
4
3
2
1
1 10 20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1976

Figure 1.2-26

1.2.3 Alluvial Aquifers

The drilling and completion of fifteen alluvial aquifer test holes associated with Tract C-a were described in RBOSP Progress Reports 2, 3 and 4. The holes which encountered water were: G-S S-7, G-S S-8, G-S S-11, G-S S-12, G-S S-19, G-S S22, G-S S-23 and G-S S-24. Continuous water level recorders (Stevens Type F) were installed at G-S S-7, G-S S-8, G-S S-11 and G-S S-12. Water quality information, conductivity, temperature, pH, and water level data for the alluvial holes monitored on or near Tract C-a are shown in Figures 1.2-27 through 1.2-42.

According to the revised schedule approved by the AOSS for the alluvial aquifer monitoring program, samples for standard chemical analysis should be collected in February, July, November, and monthly during the snow melt flash flood season, namely, from April through September. Therefore, no samples were collected in March, 1976. The revised schedule also requires all samples from the alluvial holes be filtered prior to laboratory analysis. The process was done in the field by means of a pressurized filtration unit.

Water level data for the alluvial holes are summarized in Table 1.2-14. During this quarter alluvial holes recorded an average overall rise in water level of approximately 0.6 feet. The general increase was observed in April and May. Six holes that had overall quarterly increases in water levels are G-S S-8, S-11, S-12, S-19, S-22 and S-23, while water levels in G-S S-7 and S-24 declined.

Conductivity measured in the field indicated that the trend was relatively stable to slightly increasing as compared to the last quarterly period. Measurements of specific conductance generally ranged from 1050 umhos/cm near the western boundary of the tract to approximately 2000 umhos/cm near the 84 Mesa. An overall increase of 100 umhos/cm was observed in the majority of the wells. Water temperature ranged from 7.5^{o}C measured at G-S S-24 to 10.5^{o}C at G-S S-19 and S-23. The temperature trend increased from April to May by 1^{o} to 2.5^{o}C.

Measurements of pH remained between 6.0 - 6.5. G-S S-22 and S-24 showed slightly dropping values. Since pH data was somewhat scattered this quarter, overall trends are not possible to determine with reliability.

Correlation of increases between field measured parameters (temperature, specific conductance, pH) was not possible. In part, this may be due to the lack of enough data points. However, the general trends this quarter reflect the expected seasonal nature of precipitation and temperature. Increases in water level generally follow the increase in precipitation. Temperature increases reflect the seasonal influence.

Overall water quality of the alluvial aquifer remained relatively stable. Constituents showing major amounts included: bicarbonate, magnesium, silicon dioxide, sodium, total dissolved solids, alkalinity, and sulfate. Calcium and carbonate concentration increased by 50% to 100% as compared to last quarter. Other constituents which showed significant decreases were iron, boron, and nitrate.

Tables 1.2-15 and 1.2-16 presented the summaries of the water quality analyses.

Water quality samples were not collected from shallow alluvial holes S-8 and S-19 in April, 1976. S-8 was visited by a mouse who expired in the well, therefore, contaminating any sample which would have been taken. The well was bailed in order to get as much of the remains as possible removed from the well. The well was next sampled in May, 1976.

TABLE 1.2-14
ALLUVIAL HOLES
COMPARATIVE WATER DEPTHS

	December - February Depth in Feet			March - May Depth in Feet		
Hole No.	Maximum	Minimum	Quarterly Change	Maximim	Minimum	Quarterly Change *
G-S S- 6			dry			dry
G-S S- 7	22.2	18.7	+ 3.5	21.3	15.2	- 2.6
G-S S- 8	38.4	37.4	- 1.0	38.3	32.6	+ 5.7
G-S S-11	44.7	44.6	- 0.1	45.3	44.2	+ 0.5
G-S S-12	34.0	33.5	+ 0.5	33.2	31.8	+ 1.4
G-S S-13			dry			dry
G-S S-14			dry			dry
G-S S-15			dry			dry
G-S S-16			dry			dry
G-S S-17			dry			dry
G-S S-18			dry			dry
G-S S-19	53.3	50.8	- 0.7	52.7	51.2	+ 0.9
G-S S-22	66.2	65.6	+ 0.6	65.6	64.9	+ 0.7
G-S S-23	29.4	28.8	+ 0.6	28.7	28.4	- 0.3
G-S S-24	6.8	6.2	- 0.6	9.1	6.8	- 2.3

* Positive value indicates water level rise.

TABLE 1.2-15

ALLUVIAL AQUIFER WATER ANALYSIS SUMMARY (WET CHEMICAL)
Values in mg/l
MARCH 1975 THROUGH APRIL 1976

ITEM	LOW	HIGH	AVERAGE	# ITEMS AVERAGED	STD. DEV.
Alkalinity	310.000	640.000	473.873	102	82.484
Aluminum	-0.100	1.200	0.140	10	0.375
Ammonia	-0.100	6.400	0.555	91	0.938
Arsenic	-0.010	-0.100	0.000	102	0.001
Barium	-1.000	-1.000	0.000	96	0.000
Bicarbonate	360.000	780.000	572.451	102	102.599
Boron	-0.010	27.000	1.185	102	3.078
Cadmium	-0.010	1.100	0.028	102	0.115
Calcium	28.000	240.000	104.098	102	38.128
Carbonate	-0.010	605.000	11.765	102	60.540
Chloride	1.300	71.000	17.355	102	8.418
Chromium	-0.010	0.200	0.009	101	0.038
Conductivity (umho/cm)	860.000	2275.000	1538.680	102	365.602
Copper	-0.010	8.000	0.519	102	1.223
Cyanide	-0.010	0.030	0.002	102	0.006
Dis. Solids	640.000	1670.000	1177.892	102	290.858
Fluoride	-0.100	1.200	0.367	101	0.189
Gross Alpha (pci/l)	1.400	31.000	11.992	84	6.759
Gross Beta (pci/l)	1.000	35.000	13.340	30	10.009
Hardness (total)	280.000	820.000	601.615	96	146.576
Iron	-0.050	28.000	7.148	102	5.813
Lead	0.010	13.000	0.367	101	1.290
Magnesium	3.700	150.000	84.775	102	37.254
Manganese	-0.050	27.000	3.244	102	4.643
Mercury	-0.001	-0.010	0.000	102	0.000
Nickel	0.010	0.200	0.074	96	0.057
Nitrate	-0.100	165.000	6.337	102	16.454
pH	6.000	7.200	6.464	102	0.326
Phosphate	-0.010	0.400	0.022	102	0.059
Selenium	-0.010	-0.100	0.000	102	0.000
Sil. Dioxide	22.000	44.000	31.275	102	4.397
Silver	-0.010	-0.100	0.007	95	0.013
Sodium	75.000	310.000	187.647	102	54.839
Sulfate	145.000	780.000	445.392	102	154.661
Zinc	0.010	13.000	0.711	100	1.455
Potassium	2.500	6.600	4.517	6	1.688
Lithium	-0.100	-0.100	0.000	6	0.000
DOC	2.900	292.000	51.290	90	61.795
Nitrite-N	-0.020	0.020	0.003	6	0.008
Bromide	0.100	0.900	0.717	6	0.306
C.O.D.	2.500	20.000	7.917	6	6.406
Phenols	-0.001	-0.001	0.000	6	0.000
Kjeldahl N	0.300	5.300	2.183	6	1.720

(-) Less than detectable limit given

TABLE 1.2-16

ALLUVIAL AQUIFERS WATER ANALYSIS SUMMARY QUALITATIVE SPECTOGRAPHIC

Values in mg/l

MARCH 1975 THROUGH APRIL 1976

ITEM	LOW	HIGH	AVERAGE	# ITEMS AVERAGED	STD. DEV.
Aluminum	0.005	5.000	0.492	96	1.029
Antimony	---	---	---	0	---
Arsenic	---	---	---	0	---
Barium	0.001	0.050	0.008	47	0.014
Beryllium	0.001	0.001	0.001	5	0.000
Bismuth	---	---	---	0	---
Boron	0.010	0.500	0.342	96	0.183
Cadmium	---	---	---	0	---
Calcium	10.000	Major	10.000	6	0.000
Cerium	---	---	---	0	---
Cesium	0.001	0.001	0.001	1	0.000
Chromium	---	0.020	0.004	15	0.006
Cobolt	0.001	0.001	0.001	4	0.000
Columbium	---	---	---	0	---
Copper	0.001	0.050	0.014	95	0.014
Dysprosium	---	---	---	0	---
Erbium	---	---	---	0	---
Europium	---	---	---	0	---
Gadolinium	---	---	---	0	---
Gallium	0.001	0.010	0.005	5	0.005
Germanium	0.001	0.001	0.001	1	0.000
Gold	---	---	---	0	---
Hafnium	---	---	---	0	---
Holmium	---	---	---	0	---
Indium	---	---	---	0	---
Iridium	---	---	---	0	---
Iron	0.010	5.000	0.279	96	0.779
Lanthanum	---	---	---	0	---
Lead	0.001	0.200	0.028	35	0.048
Lithium	0.001	0.100	0.007	82	0.015
Lutetium	---	---	---	0	---
Magnesium	5.000	Major	2228.111	9	4405.680
Manganese	0.001	0.500	0.067	95	0.122
Mercury	---	---	---	0	---
Molybdenum	0.001	0.050	0.005	56	0.009
Neodymium	---	---	---	0	---
Nickel	0.001	0.070	0.011	7	0.026
Osmium	---	---	---	0	---
Palladium	---	---	---	0	---
Platinum	---	---	---	0	---
Potassium	0.010	2.000	0.638	96	0.480
Praseodymium	---	---	---	0	---
Radium (pci/l)	0.100	1.200	0.335	60	0.231
Rhenium	---	---	---	0	---
Rhodium	---	---	---	0	---
Rubidium	---	---	---	0	---
Ruthenium	---	---	---	0	---
Samarium	---	---	---	0	---
Scandium	---	---	---	0	---
Selenium	---	---	---	0	---
Silicon	2.000	Major	5.011	94	2.757
Silver	---	0.020	0.002	30	0.004
Sodium	1.000	Major	6.253	75	2.857
Strontium	0.010	0.100	0.096	93	0.018
Tantalum	---	---	---	0	---
Terbium	---	---	---	0	---
Thallium	---	---	---	0	---
Thorium	---	---	---	0	---
Thulium	---	---	---	0	---
Tin	0.001	0.001	0.001	12	0.000
Titanium	0.001	1.000	0.031	81	0.124
Tungsten	---	---	---	0	---
Uranium	---	---	---	0	---
Vanadium	0.001	0.020	0.008	9	0.008
Ytterbium	0.001	0.001	0.001	5	0.000
Yttrium	0.010	0.020	0.012	5	0.004
Zinc	0.001	0.020	0.005	42	0.006
Zirconium	0.010	0.010	0.010	2	0.000

--- Less than minimum detectable amount

Major - Concentration too large to quantify (see wet chemical analyses)

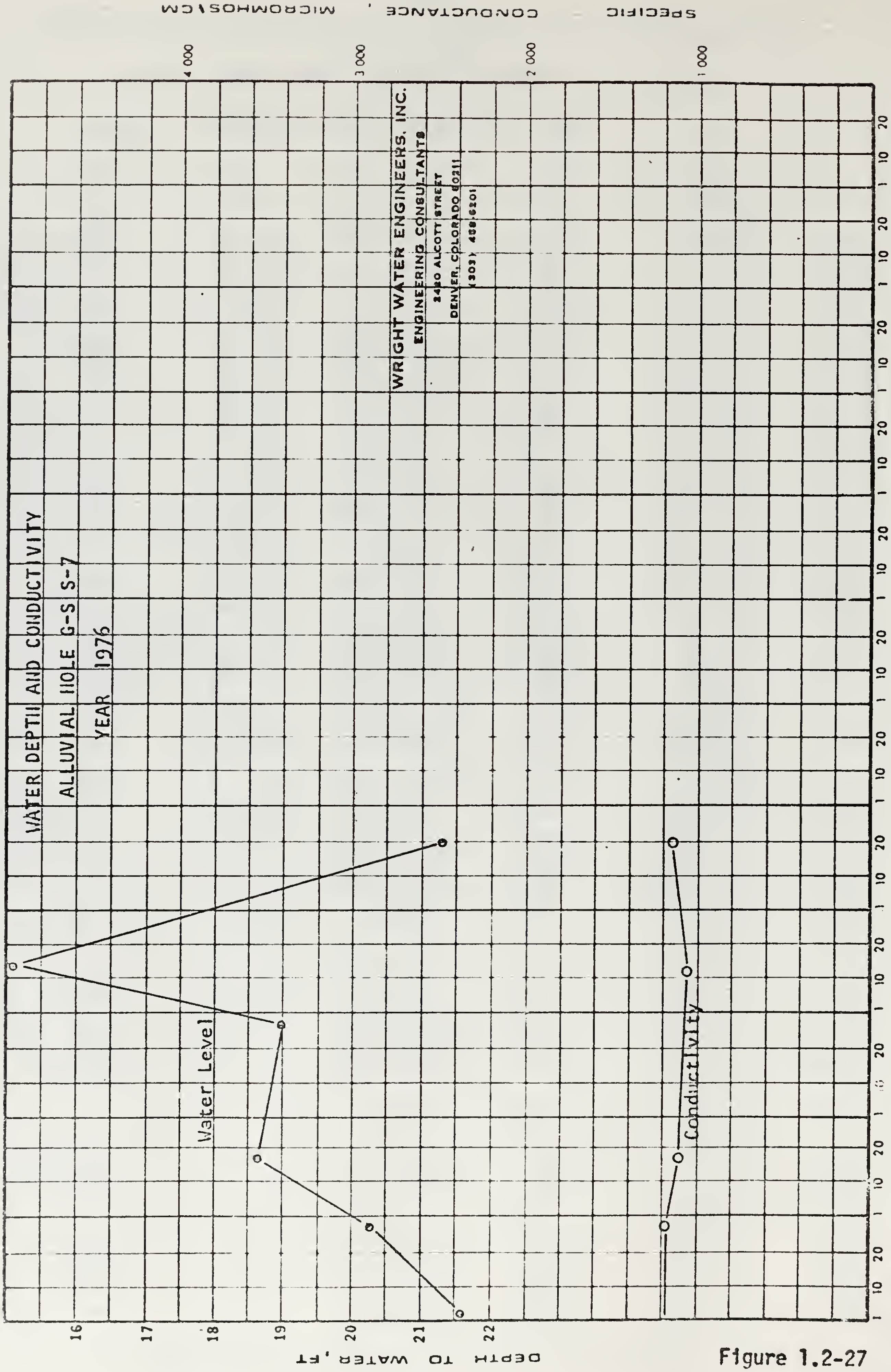
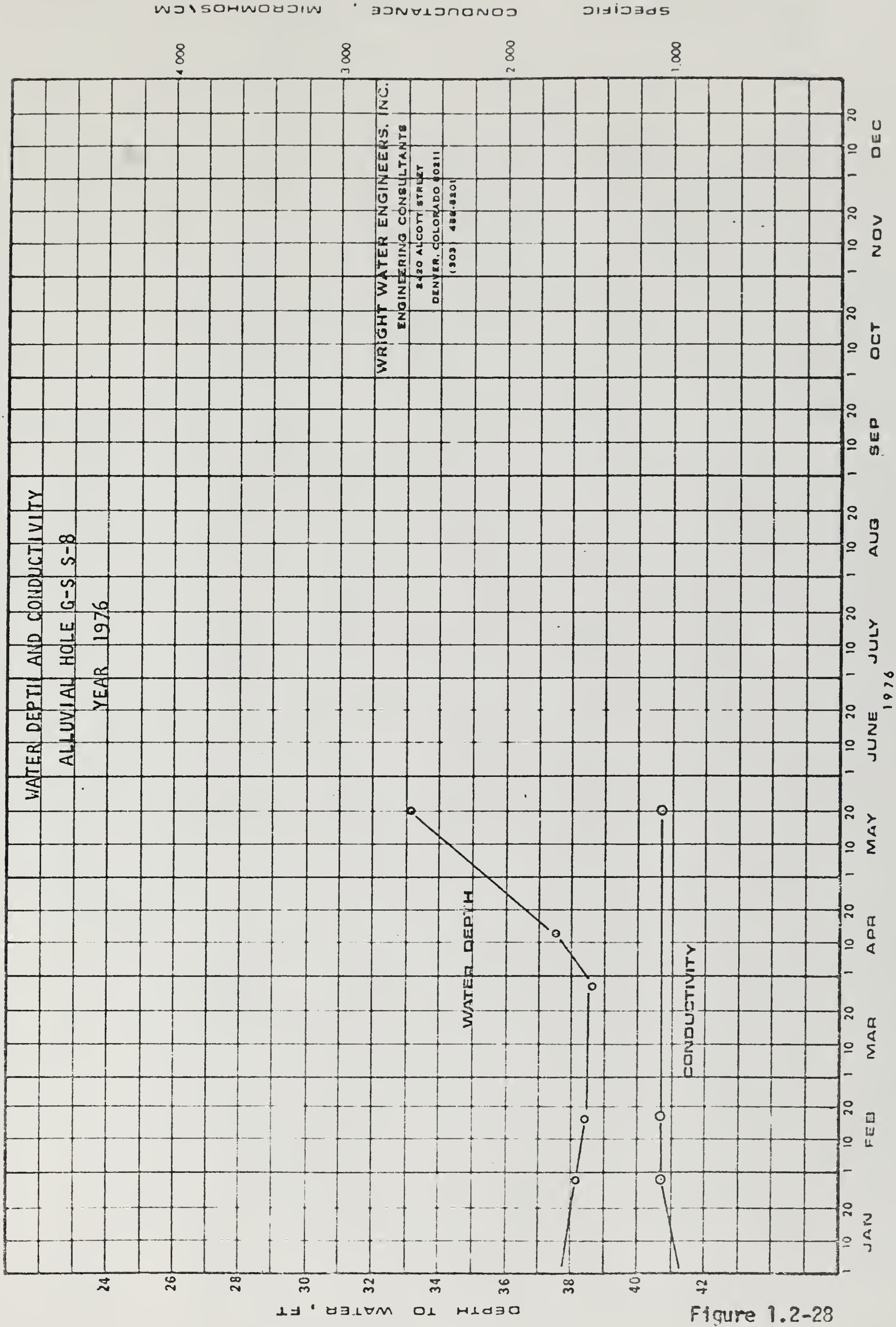

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-7
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
Water Level
Conductivity
SPECIFIC CONDUCTANCE, MICROMHOS/CM
4 000
3 000
2 000
1 000
DEPTH TO WATER, FT
16
17
18
19
20
21
22
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-27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ALLUVIAL HOLE G-S S-8
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-8201
WATER DEPTH
CONDUCTIVITY
SPECIFIC CONDUCTANCE, MICROMHOS/CM
4 000
3 000
2 000
1,000
DEPTH TO WATER, FT
24
26
28
30
32
34
36
38
40
42
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-28

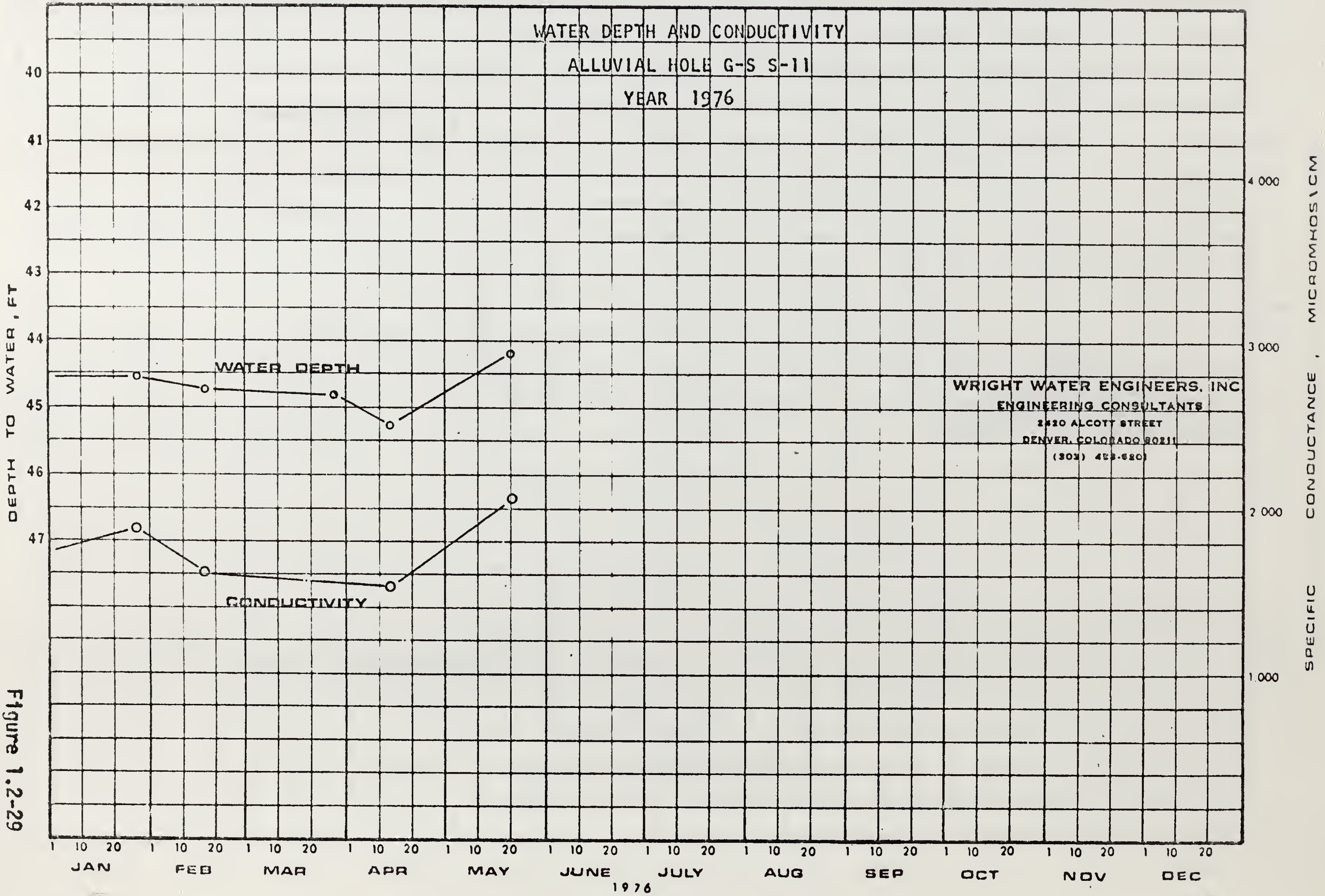

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-11
YEAR 1976
WATER DEPTH
CONDUCTIVITY
WRIGHT WATER ENGINEERS, INC
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-620
DEPTH TO WATER, FT
40
41
42
43
44
45
46
47
SPECIFIC CONDUCTANCE, MICROMHOS\CM
4 000
3 000
2 000
1,000
1 10 20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1976

Figure 1.2-29

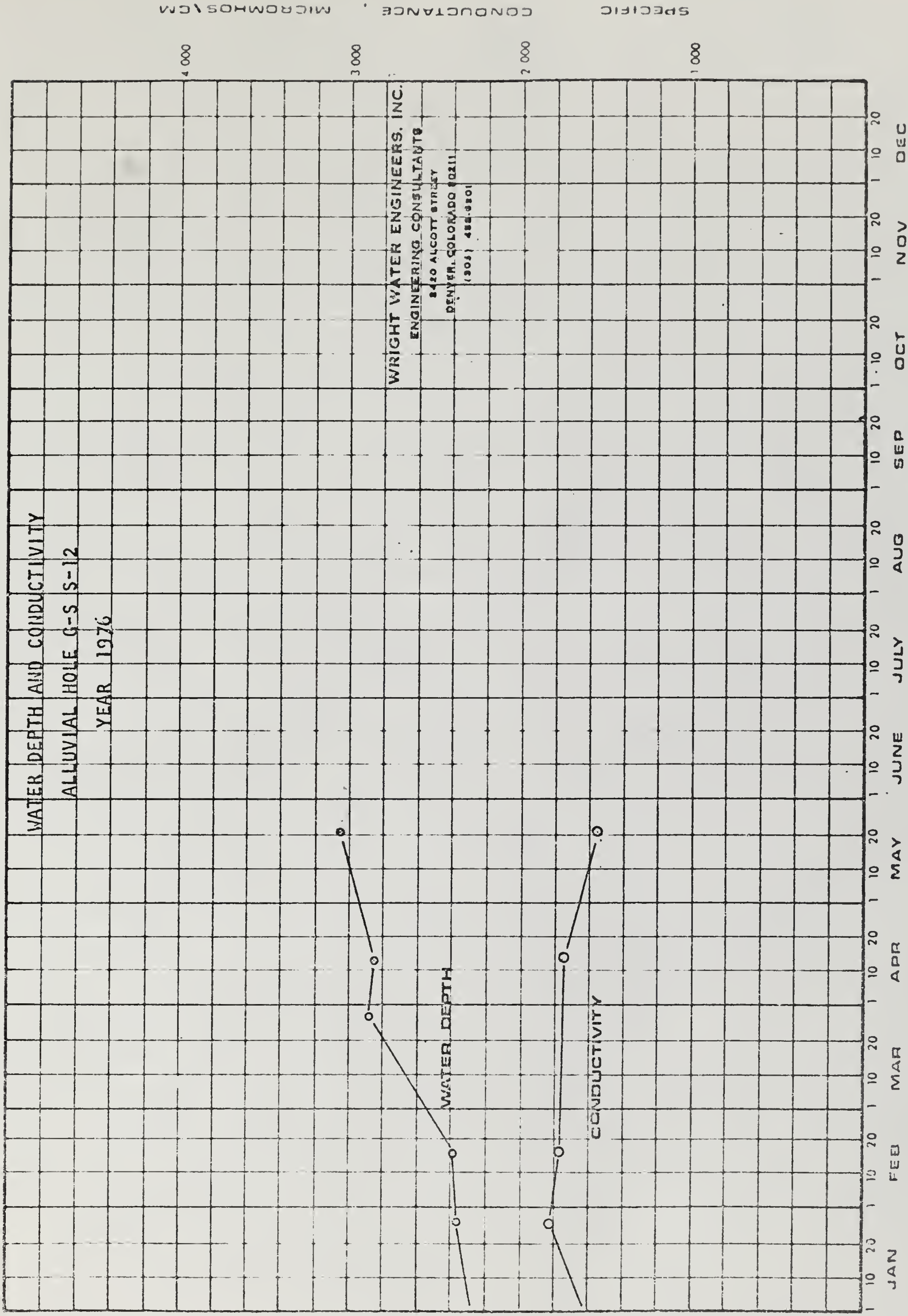

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-12
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
WATER DEPTH
CONDUCTIVITY
SPECIFIC CONDUCTANCE, MICROMHOS/CM
4 000
3 000
2 000
1 000
DEPTH TO WATER, FT
30
31
32
33
34
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-30

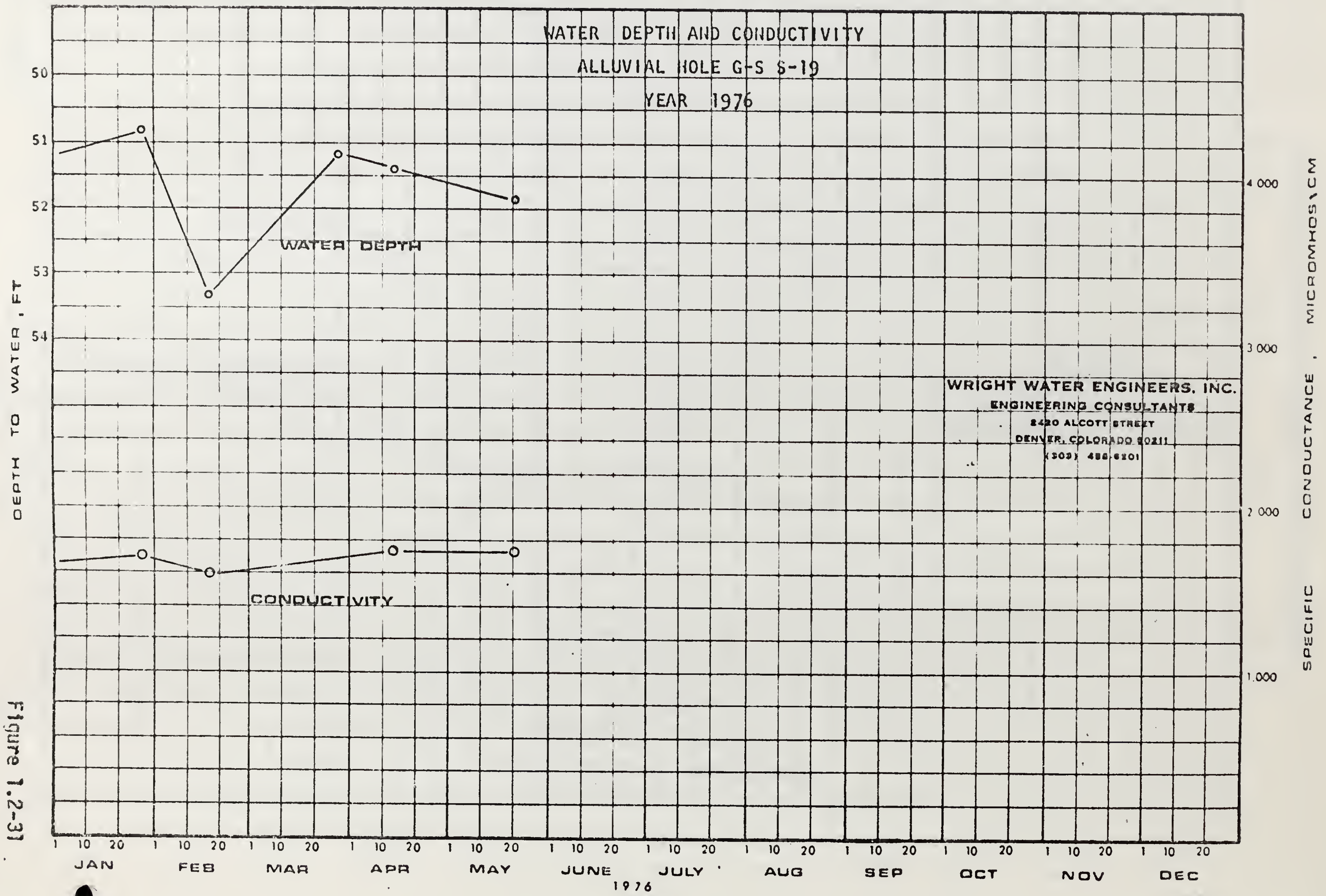

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-19
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
DEPTH TO WATER, FT
50
51
52
53
54
SPECIFIC CONDUCTANCE, MICROMHOS\CM
4 000
3 000
2 000
1,000
WATER DEPTH
CONDUCTIVITY
1 10 20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1976

Figure 1.2-31

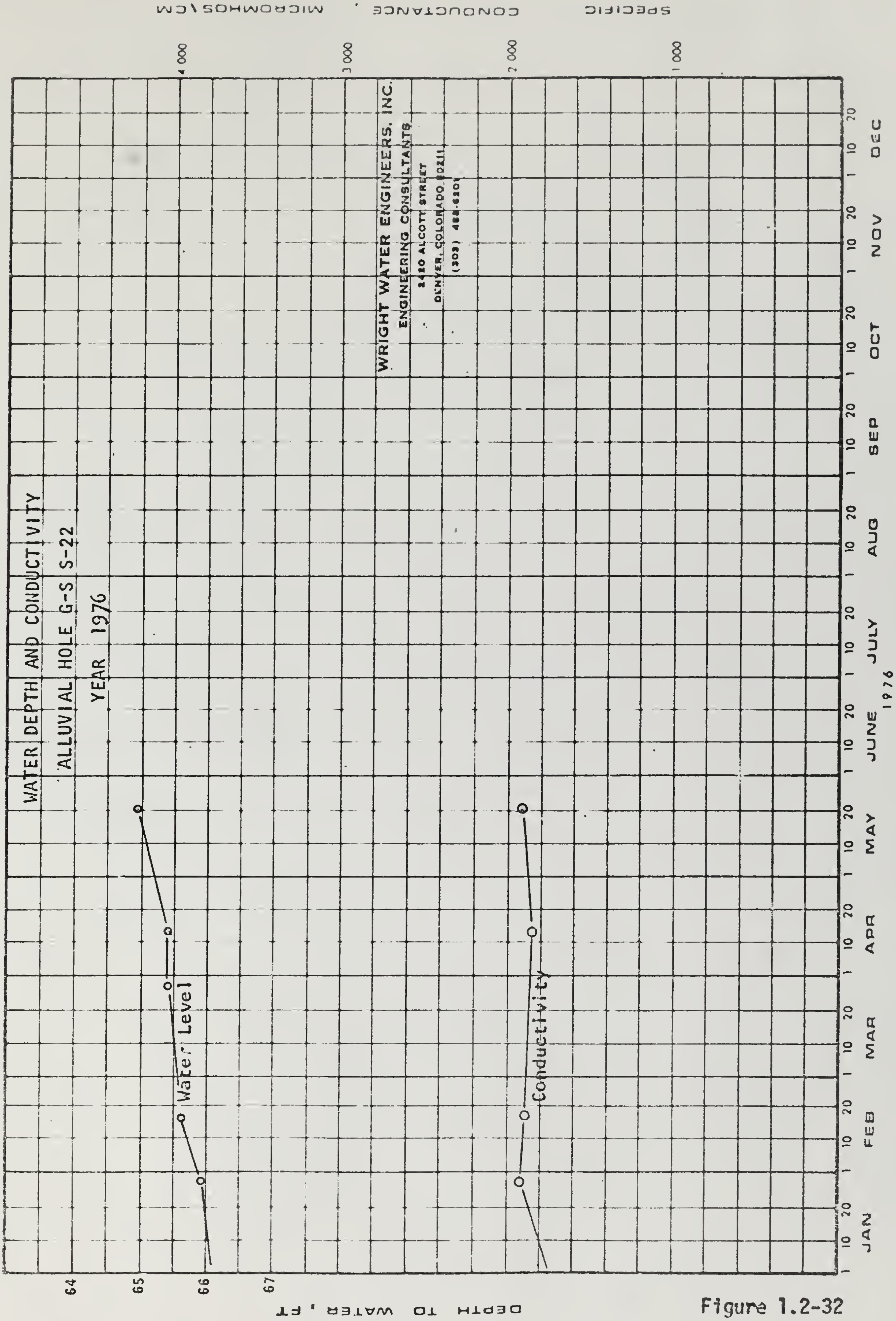

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-22
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-1700
Water Level
Conductivity
SPECIFIC CONDUCTANCE, MICROMHOS/CM
4 000
3 000
2 000
1 000
DEPTH TO WATER, FT
64
65
66
67
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-32

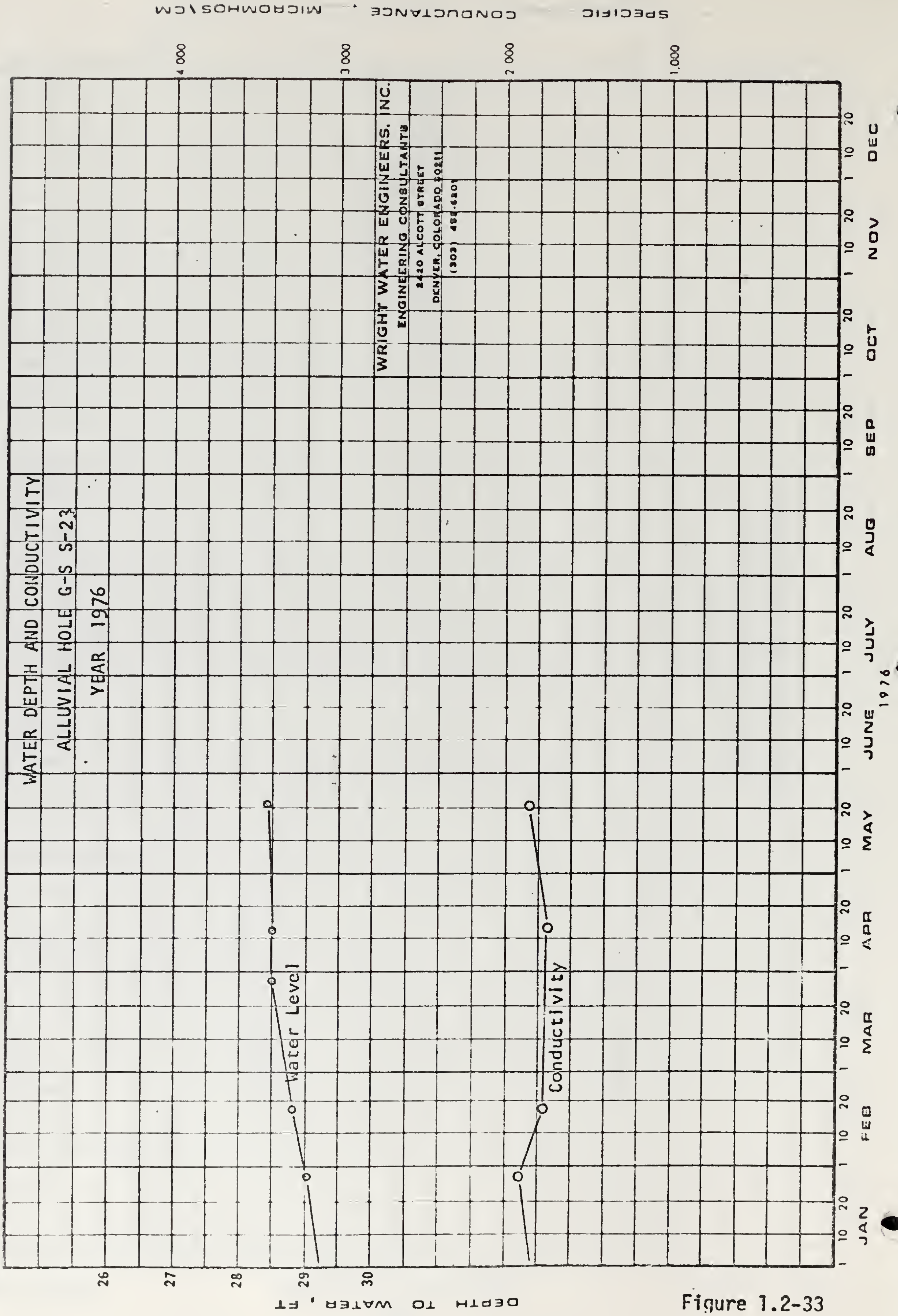

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-23
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 481-6201
SPECIFIC CONDUCTANCE, MICROMHOS/CM
4 000
3 000
2 000
1,000
DEPTH TO WATER, FT
26
27
28
29
30
Water Level
Conductivity
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-33

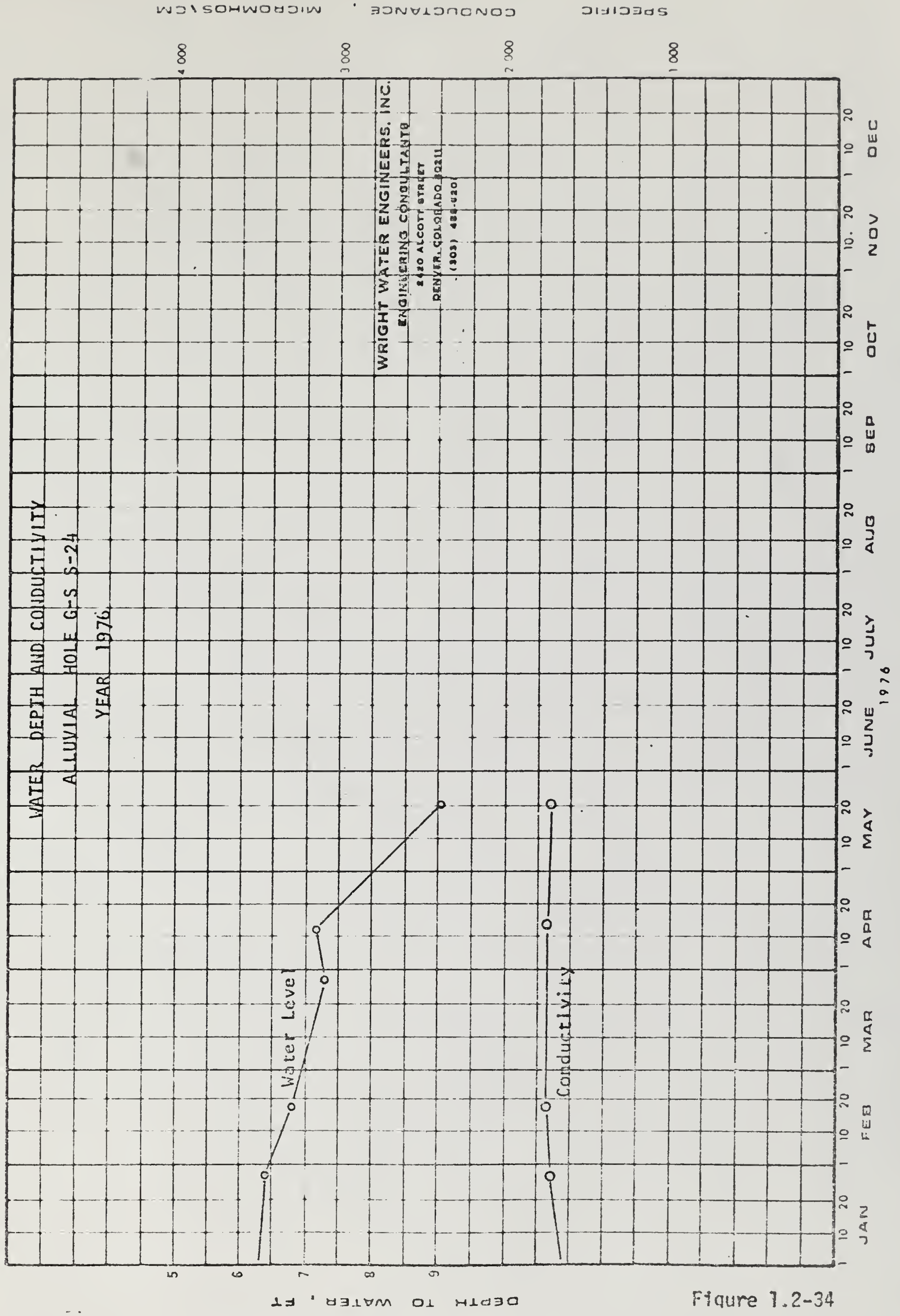

WATER DEPTH AND CONDUCTIVITY
ALLUVIAL HOLE G-S S-24
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-620
Water Level
Conductivity
SPECIFIC CONDUCTANCE, MICROMHOS/CM
4 000
3 000
2 000
1 000
DEPTH TO WATER, FT
5
6
7
8
9
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-34

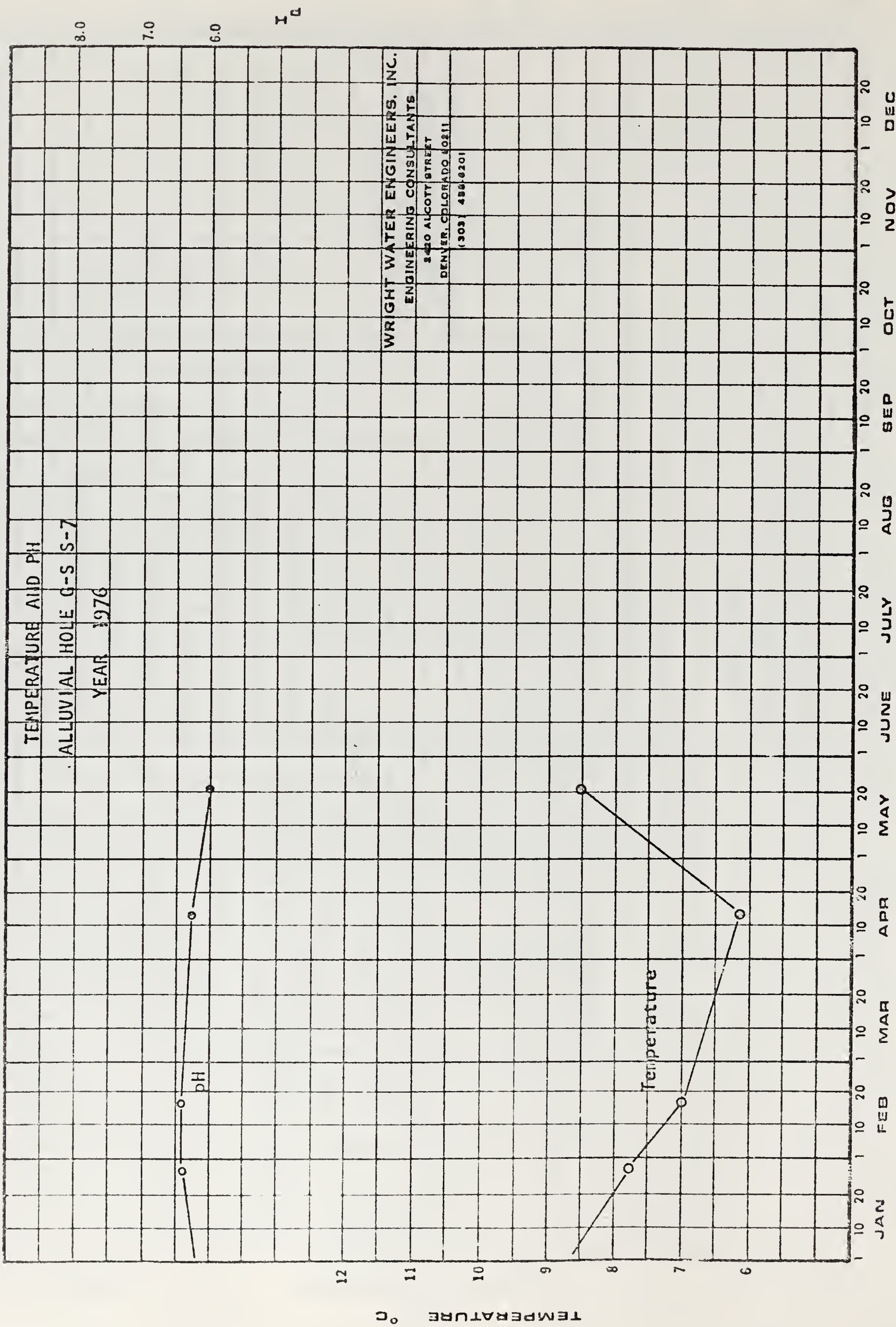

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-7
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
pH
8.0
7.0
6.0
pH
Temperature
TEMPERATURE °C
12
11
10
9
8
7
6
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1 10 20
1976

Figure 1.2-35

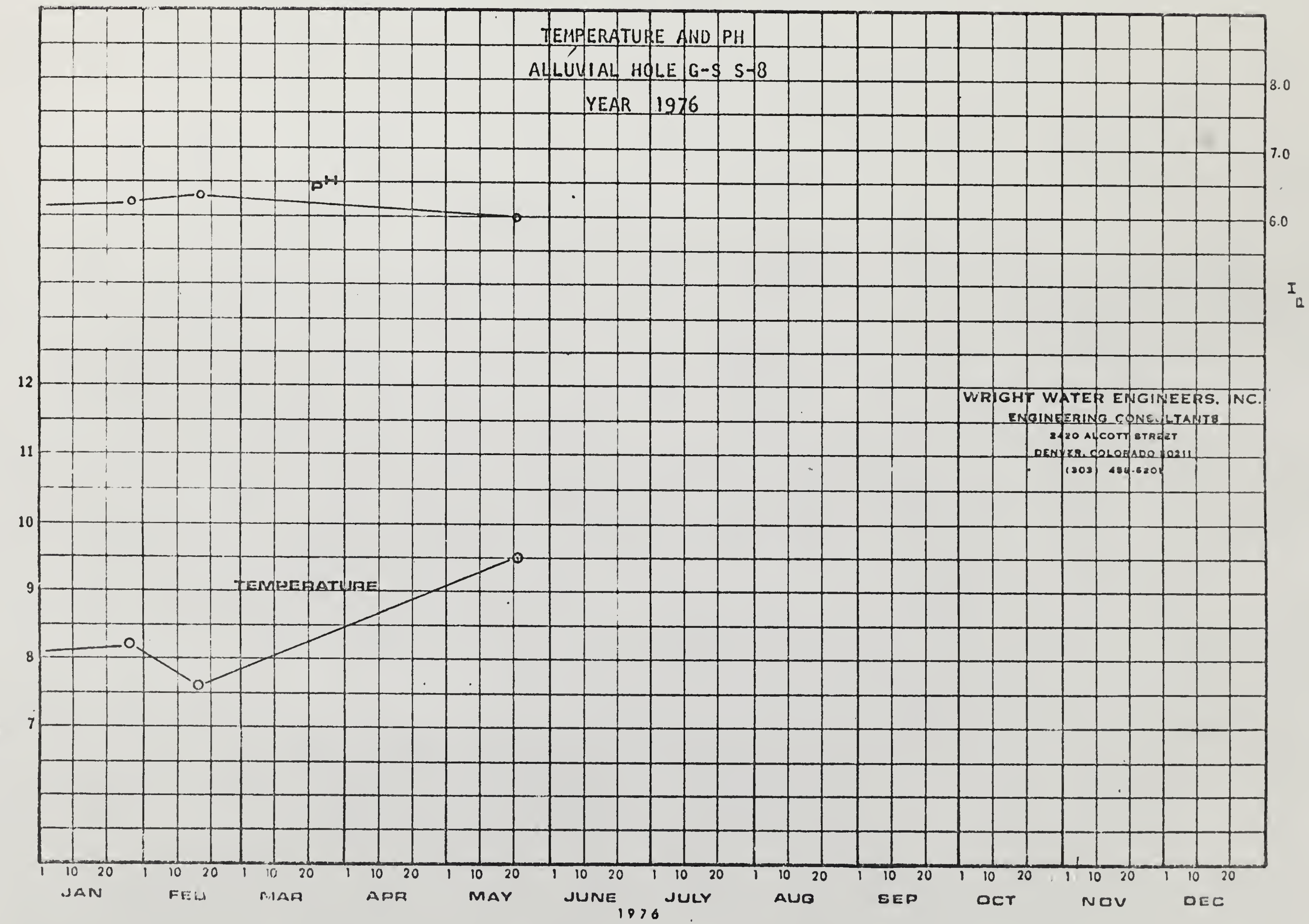

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-8
YEAR 1976
pH
TEMPERATURE
TEMPERATURE °C
12
11
10
9
8
7
8.0
7.0
6.0
pH
1 10 20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-6201

Figure 1.2-36

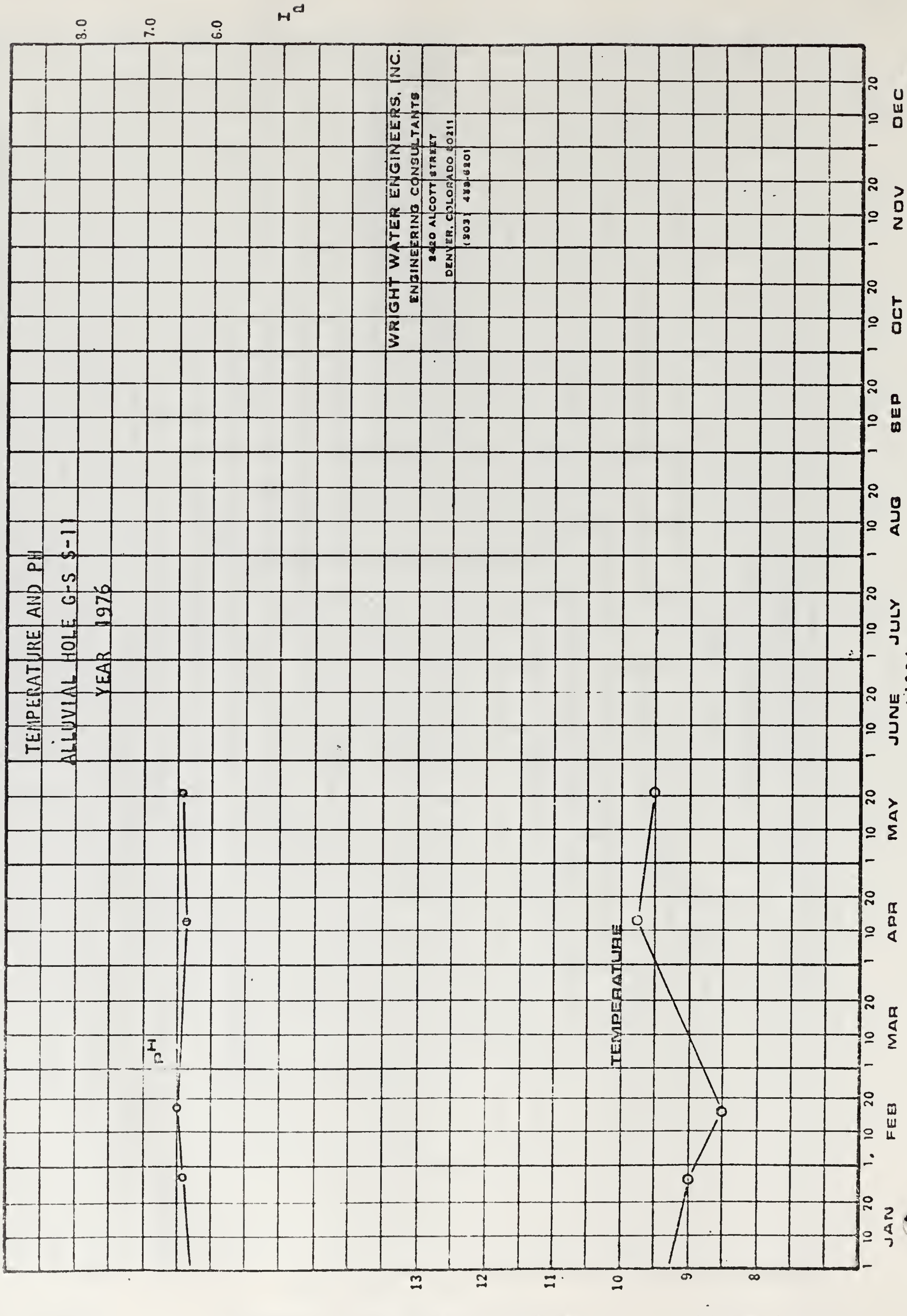

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-11
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-6201
pH
8.0
7.0
6.0
pH
TEMPERATURE
13
12
11
10
9
8
TEMPERATURE °C
1 10 20 JAN
1 10 20 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEP
1 10 20 OCT
1 10 20 NOV
1 10 20 DEC
1976

Figure 1.2-37

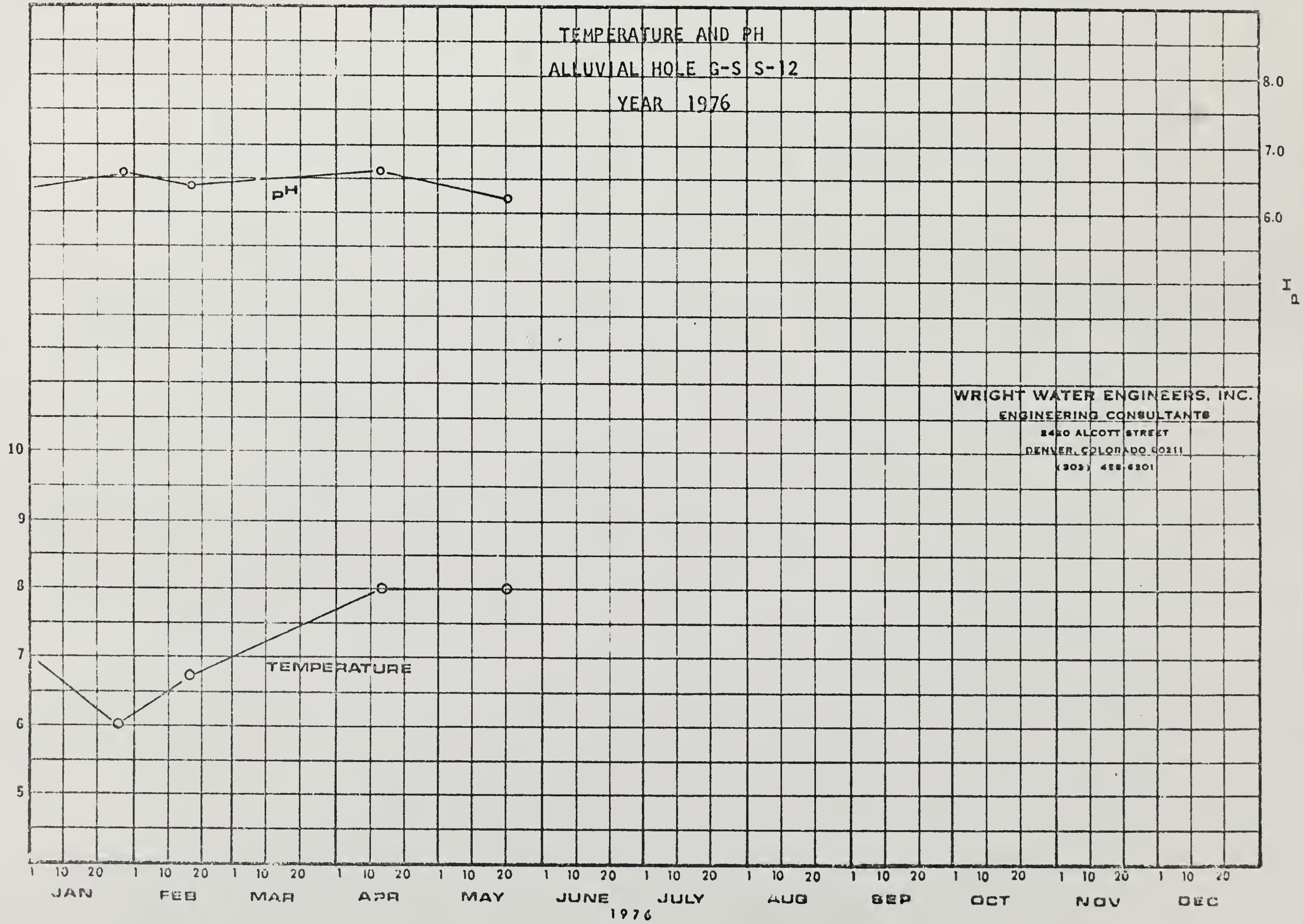

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-12
YEAR 1976
pH
TEMPERATURE
TEMPERATURE °C
10
9
8
7
6
5
pH
8.0
7.0
6.0
1
10
20
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201

Figure 1.2-38

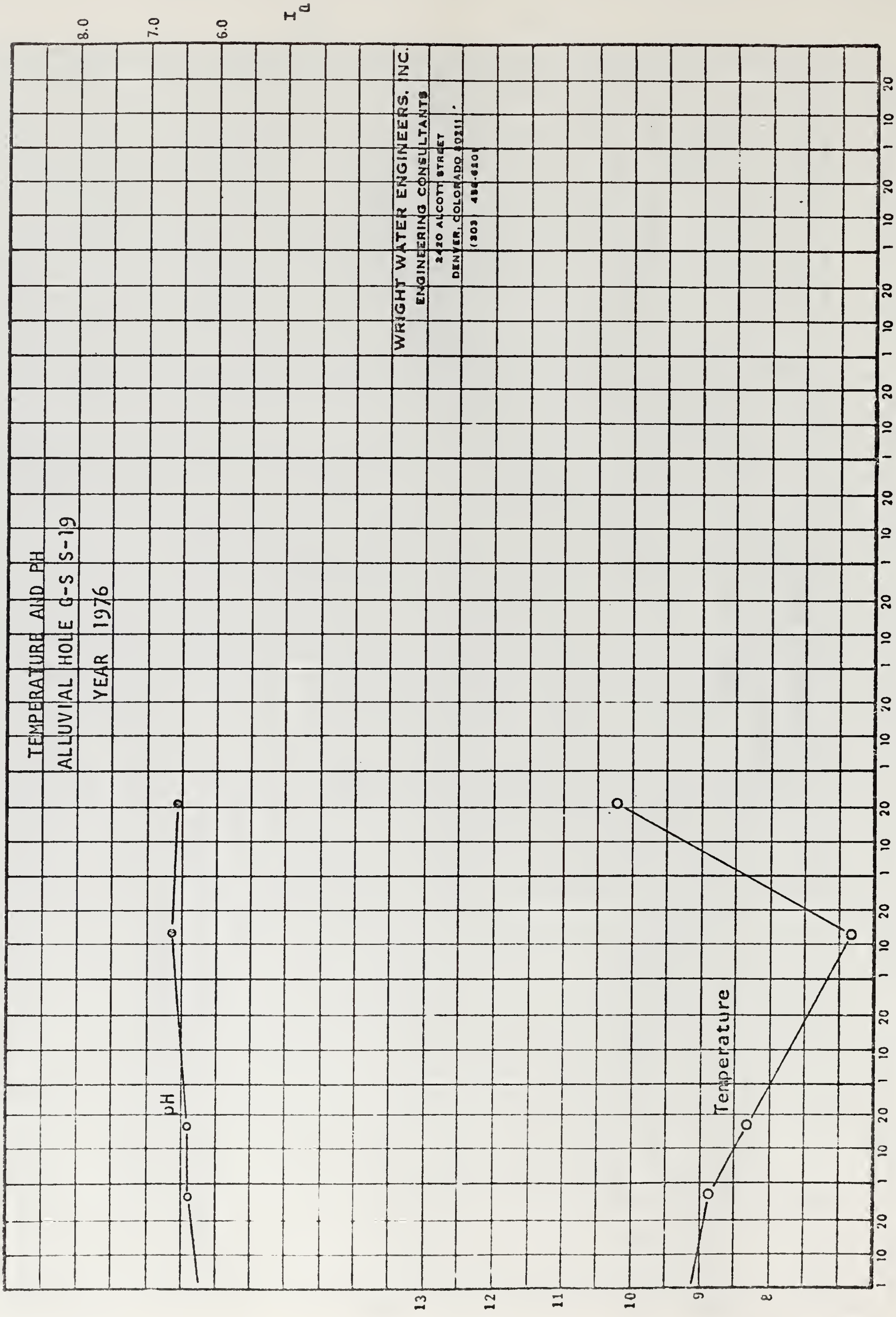

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-19
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 480-620
pH
Temperature
8.0
7.0
6.0
pH
13
12
11
10
9
8
TEMPERATURE °C
1 10 20 JAN
1 10 20 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEP
1 10 20 OCT
1 10 20 NOV
1 10 20 DEC
1976

Figure 1.2-39

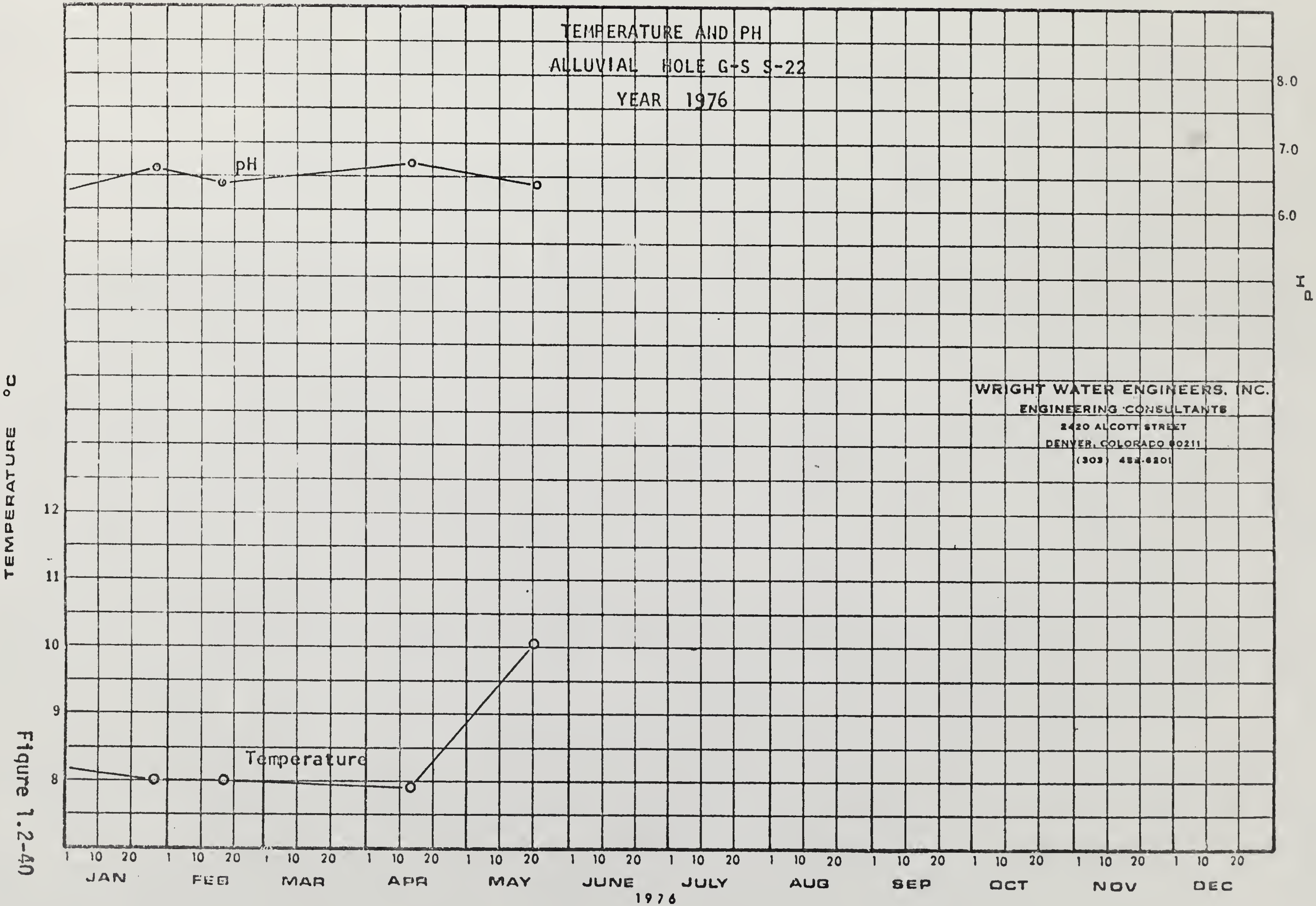

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-22
YEAR 1976
pH
Temperature
8.0
7.0
6.0
pH
12
11
10
9
8
TEMPERATURE °C
1 10 20 JAN
1 10 20 FEB
1 10 20 MAR
1 10 20 APR
1 10 20 MAY
1 10 20 JUNE
1 10 20 JULY
1 10 20 AUG
1 10 20 SEP
1 10 20 OCT
1 10 20 NOV
1 10 20 DEC
1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 45[illegible]-6201

Figure 1.2-40

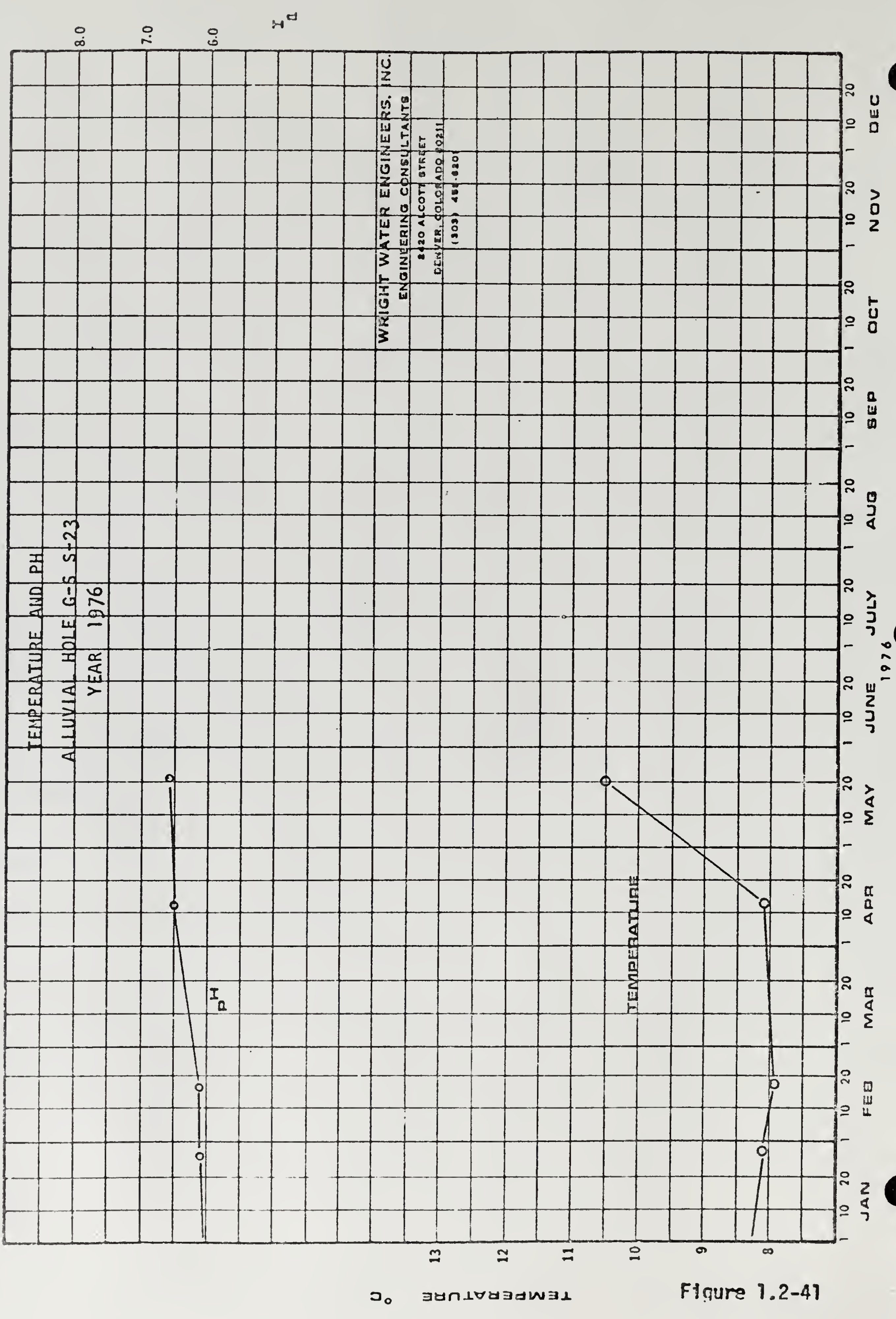

TEMPERATURE AND PH
ALLUVIAL HOLE G-5 S-23
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) 458-6201
pH
8.0
7.0
6.0
pH
TEMPERATURE
TEMPERATURE °C
13
12
11
10
9
8
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-41

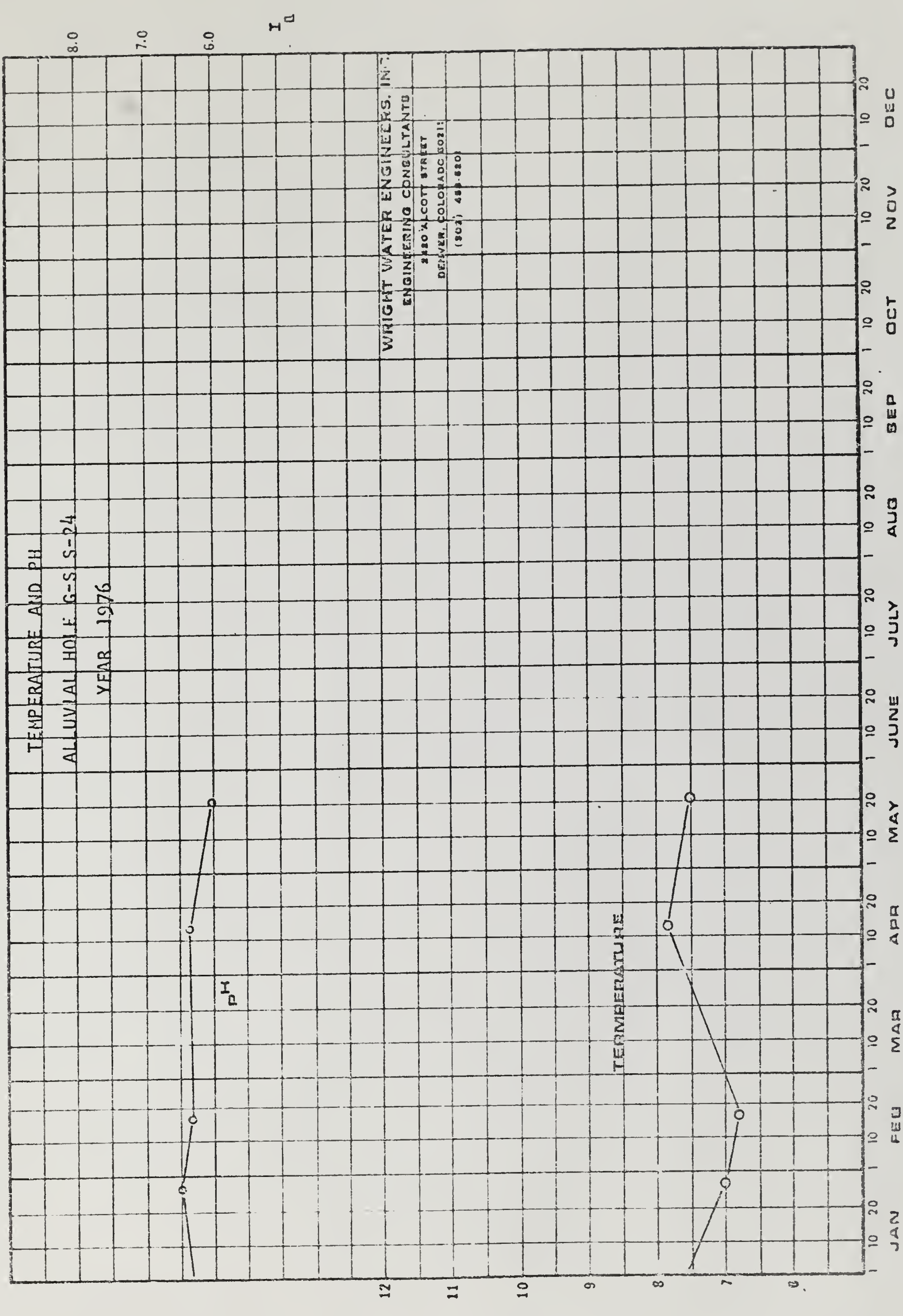

TEMPERATURE AND PH
ALLUVIAL HOLE G-S S-24
YEAR 1976
WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
pH
TEMPERATURE
8.0
7.0
6.0
12
11
10
9
8
7
6
TEMPERATURE °C
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
1
10
20
1976

Figure 1.2-42

1.2.4 Deep Aquifer Drilling Program

The Deep Aquifer Drilling Program has been previously described in RBOSP Progress Reports 2 and 4, Hydrologic Program. A summary of the drilling program is reported in RBOSP Progress Report 5.

1.2.5 Deep Aquifer Completion Program

The Deep Aquifer Completion Program is reported in RBOSP Progress Reports 2 and 4, Hydrologic Program Interpretive Text.

1.2.6 Upper and Lower Aquifer Pumping Test

Pumping Test Data can be found in RBOSP Progress Report 3, Interpretive and Raw Data Texts. Detailed interpretation is contained in RBOSP Progress Report 4, Interpretive Text, with basic data bound in the associated Raw Data Volume.

1.2.7 Deep Aquifer Monitoring

The deep aquifer monitoring program started in December, 1974. The program includes the measurement of water levels and gathering of water quality data. Water samples were collected monthly from March through August, 1975. Thereafter, water samples are collected semi-annually. The latest samples analyzed were collected in March, 1976. Shown on Figure 1.2-43 are the locations of the monitor holes.

As per RBOSP Approved Exploratory Plan, the present monitoring program consists of measuring static water levels on a monthly basis. Water level data from October, 1975 through May, 1976 are included in the Raw Data Volume of this report.

The latest samples analyzed were collected in March, 1976 and therefore will be reported in this Progress Report. Samples from several of the Holes (G-S M-4, G-S 8 and G-S 10) could not be collected due to equipment breakdown or problems associated with those specific monitor holes. Samples were not collected from the upper of lower aquifer in G-S M 4 because the sampler became lodged in the hole and attempts to free the sampler resulted in a broken cable. At the end of the quarterly reporting period, plans were to correct the problem at G-S M 4 as requested by the A.O.S.S. A water sample could not be collected in G-S 8 because something floating in the hole prevented the sampler from collecting a water sample. The problem at G-S 10 was the result of the sampler hanging up on the packer and the cable breaking,causing the sampler to fall to the bottom of the hole.

Tables 1.2-19 and 1.2-20 give depth to water for the upper and lower aquifers respectively. Figures 1.2-44 and 1.2-46 are plots of the May, 1976 upper aquifer piezometric surface and change in water level from February 17, 1976 to May 20, 1976. Upper aquifer water levels are increasing at about 1.33 feet per month near CE 708 and increasing at about 0.33 feet to 1.0 feet per month across the south side of the of the tract. Water levels across the north side of the tract are either stable or slightly decreasing at about 0.3 feet per month. The increase at CE 708 appears to be associated with spring snow melt and subsequent recharge. Water level changes over the remainder of the tract are due to general stabilization of the piezometric water level.

The lower aquifer piezometric level, on the contrary, has been decreasing since the dual aquifer completion on all the open holes. Static water level dropped approximately 0.5 feet across the tract in April as compared to March, 1976. During May, the average decrease ranged from 0.8 feet to 1.6 feet over most parts of the tract except at G-S 1, 8 and 9, which indicated relatively stable.

Figure 1.2-45 is the plot of the lower aquifer potentiometric water level as of May 20, 1976. Figure 1.2-47 shows the changes in water levels between February and May, 1976.

TABLE 1.2-17

SUMMARY OF WET CHEMICAL ANALYSIS
MONITORING PROGRAM
UPPER AND LOWER AQUIFER
TRACT C-a AND VICINITY
Values in mg/l

MARCH 1975 TO MARCH 1976

	Lower Aquifer					Upper Aquifer				
Item	Low	High	Average	No. of Items Avg'd.	Std. Dev.	Low	High	Average	No. of Items Avg'd.	Std. Dev.
Alkalinity	52.000	4500.000	941.491	100	803.756	70.000	2390.000	531.546	144	452.346
Aluminum	-0.010	0.600	0.178	9	0.215	-0.010	1.000	0.144	17	0.285
Ammonia	0.020	9.600	0.724	99	1.022	-0.100	1.800	0.420	140	0.351
Arsenic	-0.010	0.030	0.000	100	0.003	-0.010	0.050	0.001	144	0.007
Barium	-0.100	-1.000	0.0	80	0.0	-0.100	-1.000	0.0	123	0.0
Bicarbonate	260.000	2980.000	1031.600	100	787.178	85.000	2760.000	615.854	144	501.377
Boron	-0.010	9.400	1.297	100	1.594	-0.010	4.800	0.659	144	0.980
Bromide	-0.020	0.400	0.033	20	0.092	-0.020	0.500	0.083	21	0.142
C.O.D.	1.300	92.000	26.505	20	23.364	0.900	400.000	82.671	21	100.460
Cadmium	-0.001	0.020	0.001	100	0.004	-0.001	0.100	0.002	144	0.009
Calcium	0.800	115.000	17.970	100	21.357	-0.010	260.000	61.037	144	55.240
Carbonate	-0.100	710.000	100.179	100	123.015	-0.100	335.000	25.883	144	49.756
Chloride	1.400	185.000	31.738	100	32.549	-1.000	87.000	16.855	144	15.280
Chromium	-0.010	-0.050	0.004	98	0.010	-0.010	0.050	0.003	143	0.010
Conductivity (umhos/cm)	845.000	5180.000	1996.230	100	1165.356	810.000	4200.000	1578.333	144	719.757
Copper	-0.010	0.300	0.022	100	0.055	-0.010	0.800	0.025	144	0.105
Cyanide	-0.010	0.030	0.001	99	0.005	-0.010	0.100	0.001	143	0.011
D.O.C.	3.000	73.000	12.090	91	8.727	1.000	50.000	10.112	127	7.250
Dissolved Solids	540.000	3640.000	1404.300	100	808.642	540.000	2850.000	1139.444	144	506.676
Fluoride	0.200	85.000	14.784	100	15.893	0.100	60.000	3.132	144	8.984
Gross Alpha (pci/l)	0.100	30.000	5.765	72	6.041	0.200	29.000	5.334	97	5.144
Gross Beta (pci/l)	3.000	830.000	49.432	37	133.239	2.000	73.000	22.464	28	18.558
Hardness (total)	20.000	690.000	185.313	80	164.773	32.000	1110.000	396.244	123	238.089
Iron	-0.050	16.200	3.350	100	3.752	-0.050	18.000	5.373	144	4.768
Lead	0.003	26.000	1.001	100	3.278	0.002	3.800	0.404	144	0.561
Lithium	-0.100	0.200	0.035	20	0.067	-0.100	0.100	0.010	21	0.030
Magnesium	1.900	130.000	31.811	100	28.387	3.500	200.000	57.758	144	36.436
Manganese	-0.050	0.800	0.099	100	0.125	-0.010	1.000	0.187	144	0.179
Mercury	-0.001	-0.010	0.000	100	0.000	-0.001	0.045	0.000	144	0.004
Nickel	-0.001	0.100	0.026	80	0.018	-0.001	0.200	0.027	123	0.027
Nitrate	-0.100	2.000	0.331	100	0.394	-0.010	7.000	0.545	144	1.008
Nitrate-N	-0.020	-0.020	0.0	20	0.0	-0.020	-0.020	0.0	21	0.0
pH	6.000	11.000	7.377	100	0.675	6.000	8.800	6.826	144	0.464
Phenols	-0.001	-0.001	0.0	20	0.0	-0.001	-0.001	0.0	21	0.0
Phosphate	-0.100	1.000	0.043	100	0.147	-0.010	1.000	0.020	144	0.100
Potassium	-1.000	3.300	1.445	20	0.898	-1.000	2.500	1.148	21	0.684
Selenium	-0.010	-0.100	0.0	100	0.0	-0.001	-0.010	0.0	144	0.0
Silicone Dioxide	-0.100	60.000	10.176	100	8.963	-0.100	58.000	26.369	144	15.740
Silver	-0.001	0.100	0.002	80	0.011	-0.001	0.100	0.006	123	0.019
Sodium	155.000	1560.000	508.900	100	378.776	32.000	1170.000	275.882	144	224.911
Sulfate	-4.000	600.000	176.540	100	148.313	-4.000	900.000	357.049	144	180.285
Sulfide	-0.100	1.600	0.530	20	0.510	0.030	40.000	3.870	22	9.715
Zinc	0.020	68.000	1.431	100	6.938	-0.010	15.000	0.792	144	1.587

(-) Less than detectable limit given.

TABLE 1.2-18

SUMMARY OF SPECTROGRAPHIC ANALYSIS
MONITORING PROGRAM
UPPER AND LOWER AQUIFER
TRACT C-a AND VICINITY
Values in mg/l

MARCH 1975 TO MARCH 1976

Item	Lower Aquifer					Upper Aquifer				
	Low	High	Average	No. of Items Avg'd.	Std. Dev.	Low	High	Average	No. of Items Avg'd.	Std. Dev.
Aluminum	0.001	1.000	0.065	100	0.122	0.001	1.000	0.115	144	0.190
Antimony	0.200	0.200	0.200	1	0.0	--	--	--	0	--
Arsenic	--	--	--	0	--	--	--	--	0	--
Barium	0.001	0.010	0.002	13	0.003	0.001	0.010	0.003	23	0.004
Beryllium	--	--	--	0	--	--	--	--	0	--
Bismuth	--	--	--	0	--	--	--	--	0	--
Boron	0.100	0.500	0.357	98	0.165	0.100	2.000	0.364	144	0.236
Cadmium	--	--	--	0	--	--	--	--	0	--
Calcium	0.100	Major	5.462	24	3.906	1.000	Major	7.882	17	3.533
Cerium	--	--	--	0	--	--	--	--	0	--
Cesium	--	--	--	0	--	--	--	--	0	--
Chromium	--	--	--	0	--	--	--	--	0	--
Cobalt	--	--	--	0	--	--	--	--	0	--
Columbium	--	--	--	0	--	--	--	--	0	--
Copper	0.001	0.020	0.005	91	0.005	0.001	0.020	0.006	134	0.005
Dysprosium	--	--	--	0	--	--	--	--	0	--
Erbium	--	--	--	0	--	--	--	--	0	--
Europium	--	--	--	0	--	--	--	--	0	--
Gadolinium	--	--	--	0	--	--	--	--	0	--
Gallium	--	--	--	0	--	--	--	--	0	--
Germanium	--	--	--	0	--	--	--	--	0	--
Gold	--	--	--	0	--	--	--	--	0	--
Hafnium	--	--	--	0	--	--	--	--	0	--
Holmium	--	--	--	0	--	--	--	--	0	--
Indium	--	--	--	0	--	--	--	--	0	--
Iridium	--	--	--	0	--	--	--	--	0	--
Iron	0.010	0.500	0.047	98	0.087	0.010	1.000	0.102	143	0.194
Lanthanum	--	--	--	0	--	--	--	--	0	--
Lead	0.000	0.500	0.033	29	0.097	0.001	0.200	0.020	41	0.044
Lithium	0.001	0.100	0.011	73	0.020	0.001	0.500	0.014	100	0.053
Lutetium	0.010	0.010	0.010	1	0.0	0.001	0.010	0.005	2	0.006
Magnesium	0.100	Major	3.078	23	3.236	0.100	Major	6.006	18	4.290
Manganese	0.001	0.100	0.012	83	0.023	0.001	0.200	0.019	126	0.036
Mercury	--	--	--	0	--	--	--	--	0	--
Molybdenum	0.001	0.100	0.010	50	0.018	0.001	0.500	0.018	80	0.078
Neodymium	--	--	--	0	--	--	--	--	0	--
Nickel	0.001	0.001	0.001	1	0.00	0.001	0.001	0.001	2	0.00
Osmium	--	--	--	0	--	--	--	--	0	--
Palladium	--	--	--	0	--	0.100	0.100	0.100	1	0.00
Platinum	--	--	--	0	--	--	--	--	0	--
Potassium	0.010	5.000	0.890	97	1.083	0.010	5.000	0.915	141	1.119
Praseodymium	--	--	--	0	--	--	--	--	0	--
Radium (pci/l)	0.090	0.900	0.375	24	0.258	0.100	0.800	0.200	26	0.160
Rhenium	--	--	--	0	--	--	--	--	0	--
Rhodium	--	--	--	0	--	--	--	--	0	--
Rubidium	--	--	--	0	--	--	--	--	0	--
Ruthenium	--	--	--	0	--	--	--	--	0	--
Samarium	--	--	--	0	--	--	--	--	0	--
Scandium	--	--	--	0	--	--	--	--	0	--
Selenium	--	--	--	0	--	--	--	--	0	--
Silicon	-0.500	10.000	4.310	100	2.131	1.000	20.000	5.104	144	3.756
Silver	0.000	0.001	0.001	6	0.000	0.000	0.001	0.001	13	0.000
Sodium	2.000	Major	7.346	52	2.611	2.000	Major	7.327	98	2.917
Strontium	0.001	1.000	0.097	90	0.102	0.001	1.000	0.107	134	0.094
Tantalum	--	--	--	0	--	--	--	--	0	--
Terbium	--	--	--	0	--	--	--	--	0	--
Thallium	--	--	--	0	--	--	--	--	0	--
Thorium	--	--	--	0	--	--	--	--	0	--
Thulium	--	--	--	0	--	--	--	--	0	--
Tin	0.000	0.001	0.001	2	0.001	0.001	0.001	0.001	1	0.00
Titanium	0.001	0.010	0.003	40	0.004	0.001	0.020	0.004	77	0.004
Tungsten	--	--	--	0	--	--	--	--	0	--
Uranium	-1.500	-1.500	0.0	1	0.0	--	--	--	0	--
Vanadium	--	--	--	0	--	0.001	0.001	0.001	1	0.0
Ytterbium	--	--	--	0	--	--	--	--	0	--
Yttrium	--	--	--	0	--	--	--	--	0	--
Zinc	0.001	0.200	0.012	22	0.042	0.001	0.200	0.013	44	0.036
Zirconium	--	--	--	0	--	--	--	--	0	--

-- Less than minimum detectable amount

Major - Concentration too large to quantify (see wet chemical analyses)

TABLE 1.1-19
UPPER AQUIFER

WATER LEVEL

October, 1975 thru May, 1976

Below Ground Surface (ft.)

	9 Oct.	20 Nov.	12 Dec.	28 Jan.	17 Feb.	29 Mar.	14 April	21 May	June	July	Aug.	Sept.
AM 2A	389.45	387.63	386.41	385.17	384.34	383.19	382.50	381.85				
AM 3	33.57	33.45	33.11	33.23	33.04	32.79	31.60	30.04				
CE 702	52.40	52.30	52.39	52.64	52.65	52.80	52.66	53.02				
CE 707	259.79	258.76	258.11	257.25	256.64	242.22	250.32	--				
CE 708	48.87	50.60	49.86	51.78	51.80	51.30	47.72	44.81				
CE 709	39.84	37.02	36.14	35.90	35.69	35.50	34.88	35.00				
G-S 1	244.68	245.27	245.59	246.19	246.53	246.28	244.53	243.26				
G-S 2-3	103.49	102.75	102.35	102.25	101.97	100.87	100.28	99.86				
G-S 4-5	75.05	74.77	74.29	74.36	74.01	73.48	72.98	72.86				
G-S 6	55.62	55.54	55.42	55.50	55.45	55.27	54.95	55.22				
G-S 8												
G-S 9	311.43	312.69	316.33	319.29	319.95	321.42	320.94	317.03				
G-S 10	340.35	340.11	--	339.75	339.60	339.36	339.14	339.48				
G-S 11	460.35	459.67	459.00	458.76	458.40	457.72	456.95	456.42				
G-S 12	388.30	387.60	386.97	386.55	386.24	385.41	384.67	382.79				
G-S 13	382.62	382.19	381.68	381.72	381.45	381.04	380.97	380.41				
G-S 15	274.73			273.56	273.41	272.99	272.83	272.69				
G-S M-1	620.64	621.13	--	619.10	618.77	618.71	625.57	619.31				
G-S M-2	231.22	230.68	229.75	228.94	228.23	225.76	225.39	225.36				
G-S M-3	21.59	21.96	20.32	19.16	19.21	18.57	17.50	17.72				
G-S M-4	491.80	491.95	491.56	492.04	492.08	492.25	--	492.77				
G-S M-5	235.73	235.81	235.24	235.70	235.64	235.51	235.38	235.75				
TO-1	21.80	20.65	20.41	20.95	20.83	20.53	20.13	22.35				
TO-2	113.36	113.36	122.96	112.93	112.73	112.57	112.18	113.81				

-- Water levels not collected due to poor weather conditions making access to hole difficult or because problems with monitoring hole and equipment.

TABLE 1.2-20

LOWER AQUIFER

WATER LEVEL

October, 1975 thru May, 1976

Below Ground Surface (ft)

	9 Oct.	20 Nov.	12 Dec.	28 Jan.	17 Feb.	29 Mar.	14 April	21 May	June	July	Aug.	Sept.
AM 2A	636.67	637.70	638.08	639.71	640.11	641.15	641.63	643.56				
AM 3	310.40	311.27	311.56	313.34	313.73	314.65	315.31	316.90				
CE 702	40.48	41.21	41.25	43.00	43.41	44.21	44.64	45.81				
CE 707	567.51	568.70	569.21	570.67	571.04	572.19	572.53	--				
CE 708	297.88	298.97	299.27	300.84	301.22	302.97	303.06	303.83				
CE 709	154.31	155.55	154.92	157.62	158.63	158.87	159.60	160.82				
G-S 1	602.65	602.43	602.13	602.13	601.70	601.64	601.58	601.91				
G-S 2-3	254.92	255.98	256.61	258.03	258.32	259.43	259.81	261.05				
G-S 4-5	98.31	99.55	100.09	100.57	101.95	102.89	103.40	104.46				
G-S 6	44.06	45.88	46.26	47.72	48.12	49.01	49.45	50.65				
G-S 8	649.60	650.79	651.37	651.84	651.91	651.66	651.98	651.65				
G-S 9	513.25	514.31	514.68	516.10	516.22	517.19	517.96	517.56				
G-S 10	389.69	380.81	--	392.76	393.06	394.01	394.57	396.13				
G-S 11	721.76	723.02	723.36	725.51	725.53	726.65	727.18	727.63				
G-S 12	649.79	649.76	650.08	651.97	652.30	653.36	653.92	655.54				
G-S 13	573.82	574.98	575.36	577.08	577.34	578.39	578.96	580.40				
G-S 15	363.99	365.27	365.64	367.28	367.64	368.71	369.24	370.79				
G-S M-1	822.20	824.61	--	824.87	825.18	825.84	826.59	829.59				
G-S M-2	354.96	355.03	354.44	355.14	354.69	334.60	354.73	353.64				
G-S M-3	139.89	140.67	139.25	140.34	139.69	139.64	145.02	140.27				
G-S M-4	562.50	563.58	563.95	565.32	565.65	566.55	--	--				
TO-1	127.21	128.40	128.77	130.41	130.81	131.78	132.31	133.54				
TO-2	356.68	357.83	358.31	359.62	359.95	361.01	360.93	362.93				

-- Water levels not collected due to poor weather conditions making access to hole difficult or because problems with monitoring hole and equipment.

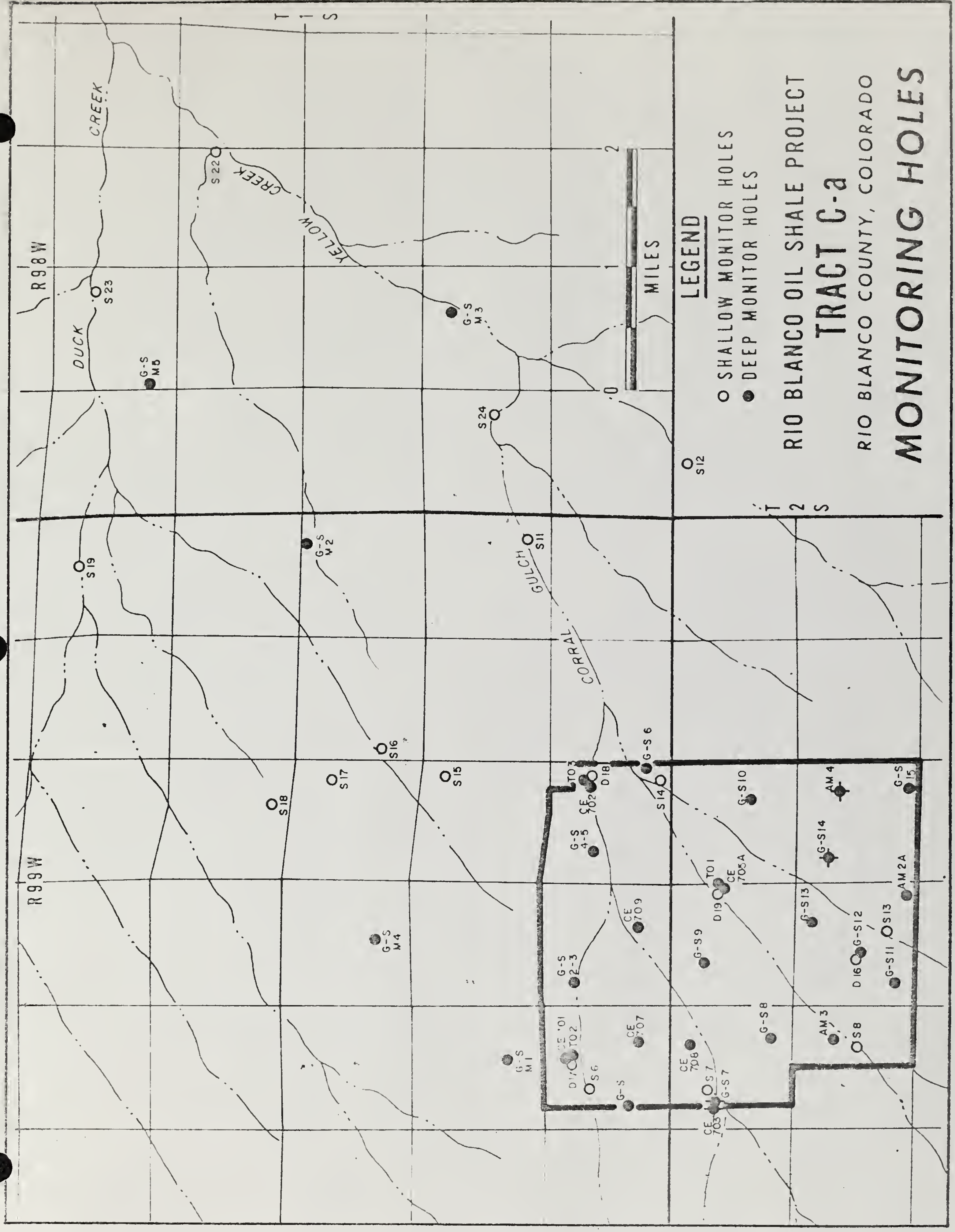
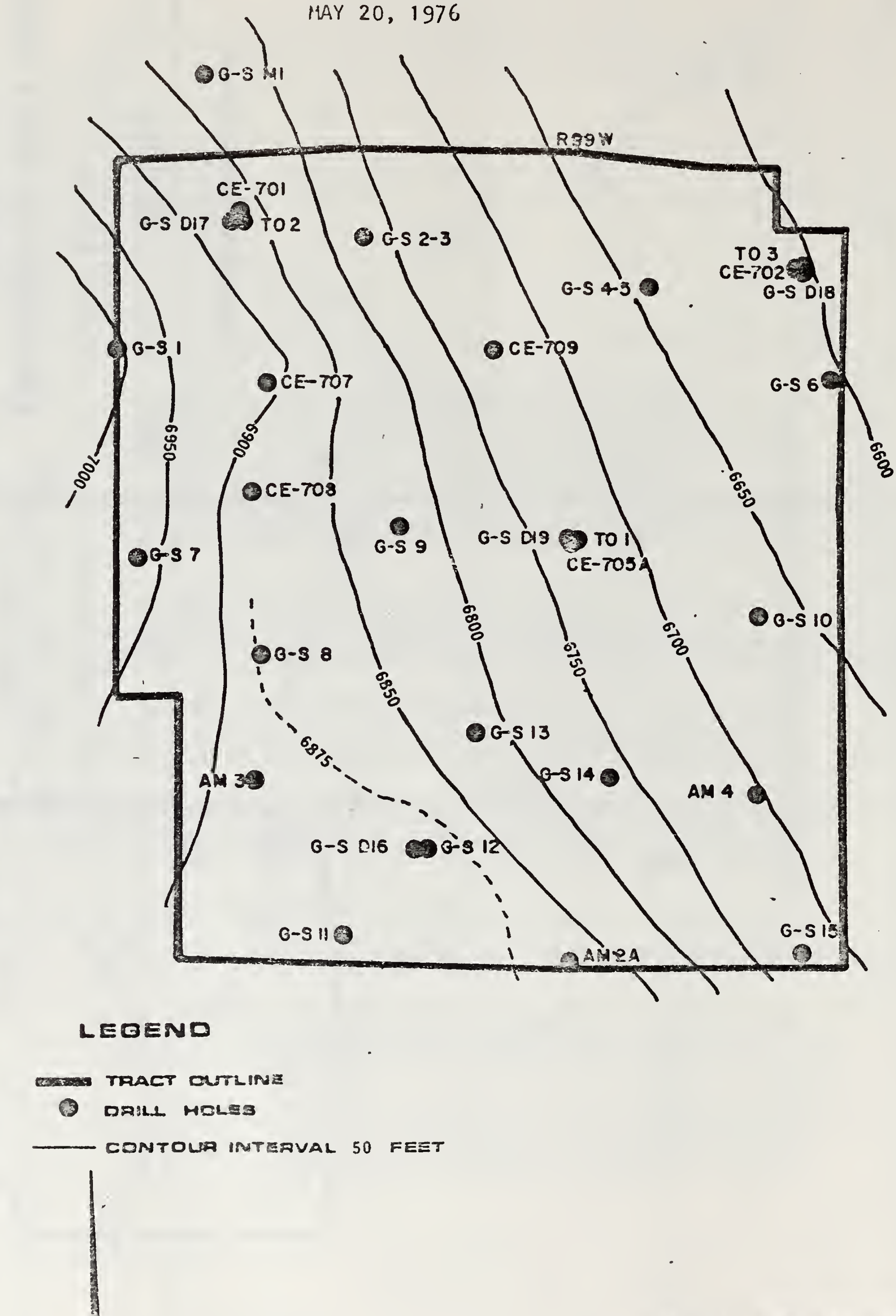

RIO BLANCO OIL SHALE PROJECT
TRACT C-a
RIO BLANCO COUNTY, COLORADO
MONITORING HOLES
LEGEND
○ SHALLOW MONITOR HOLES
● DEEP MONITOR HOLES
MILES
0
1
2
R98W
R99W
T 1 S
T 2 S
DUCK CREEK
YELLOW CREEK
CORRAL GULCH
S22
S23
S24
S12
S11
S19
S16
S17
S15
S18
S14
S6
S7
S8
S13
G-S M5
G-S M3
G-S M2
G-S M4
G-S M1
G-S 6
G-S 4-5
G-S 2-3
G-S
G-S7
G-S10
G-S9
G-S8
G-S13
G-S14
G-S12
G-S11
G-S 15
AM 4
AM2A
AM3
TO3
TO1
TO2
D18
D19
D16
D17
CE 702
CE 705A
CE 709
CE 707
CE 706
CE 703
CE 701

Figure 1.2-43

UPPER AQUIFER

PIEZOMETRIC LEVELS (ft.)

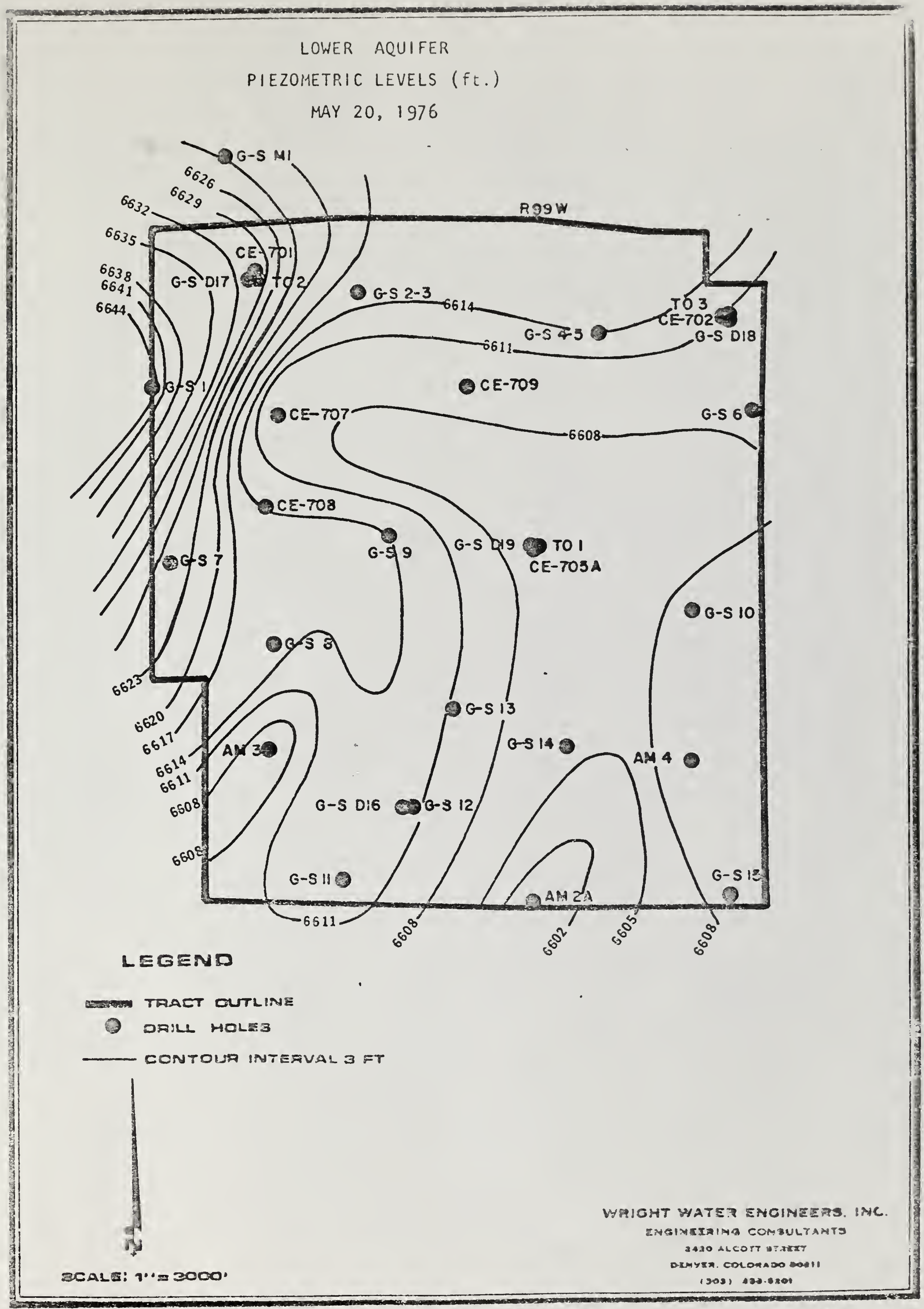
MAY 20, 1976



SCALE: 1''= 3000'

WRIGHT WATER ENGINEERS, INC.
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER, COLORADO 80211
(303) [illegible]

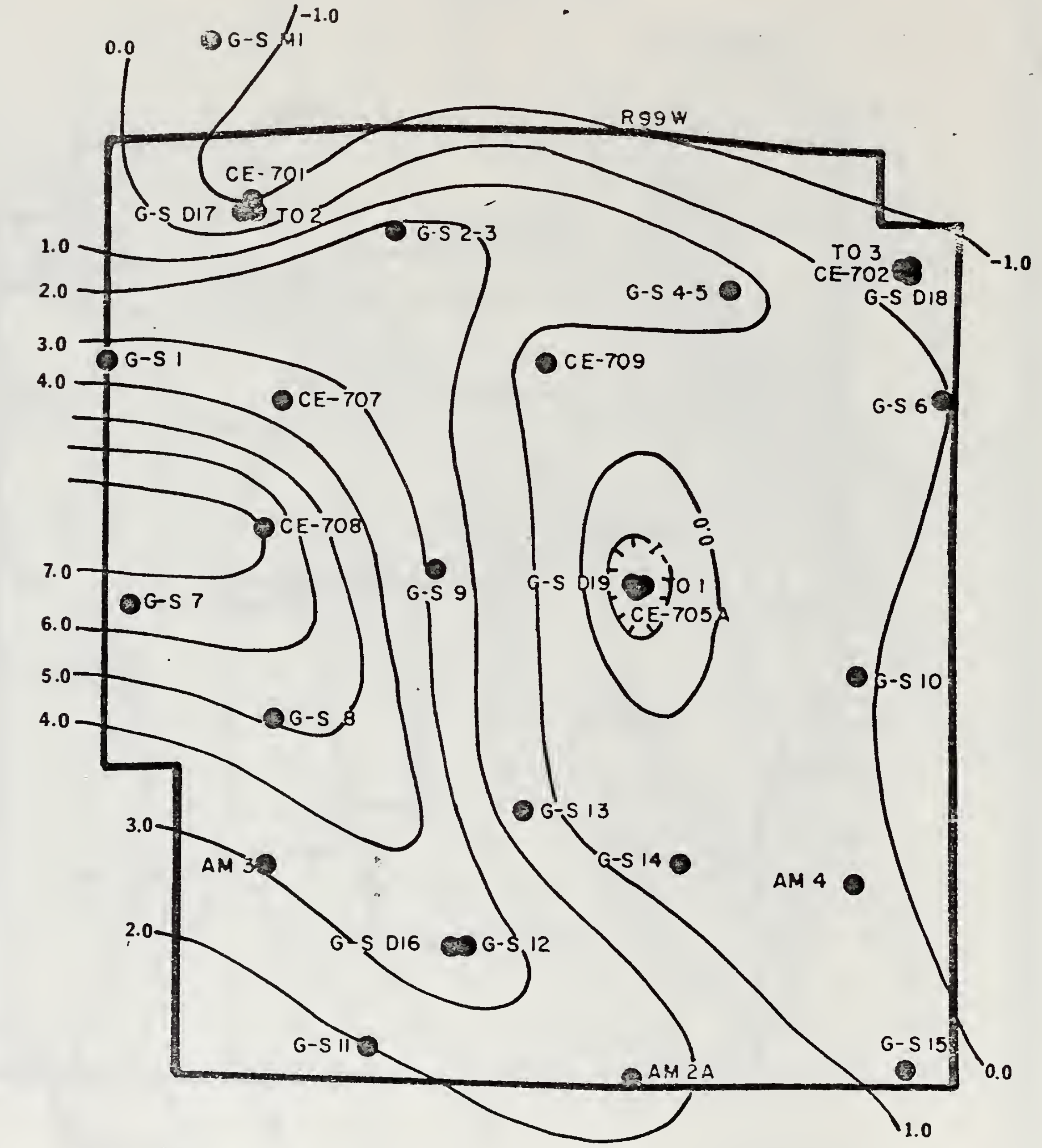
Figure 7.2-44



LOWER AQUIFER
PIEZOMETRIC LEVELS (ft.)
MAY 20, 1976

Figure 1.2-45

UPPER AQUIFER
CHANGE IN WATER LEVEL
FEBRUARY 17 - MAY 20, 1976



LEGEND

▬ TRACT OUTLINE
● DRILL HOLES
—— CONTOUR INTERVAL 1 FT

N

SCALE: 1'' = 3000'

WRIGHT WATER ENGINEERS INC
ENGINEERING CONSULTANTS
2420 ALCOTT STREET
DENVER COLORADO 80211
303 · 458 6201

Figure 1.2-46

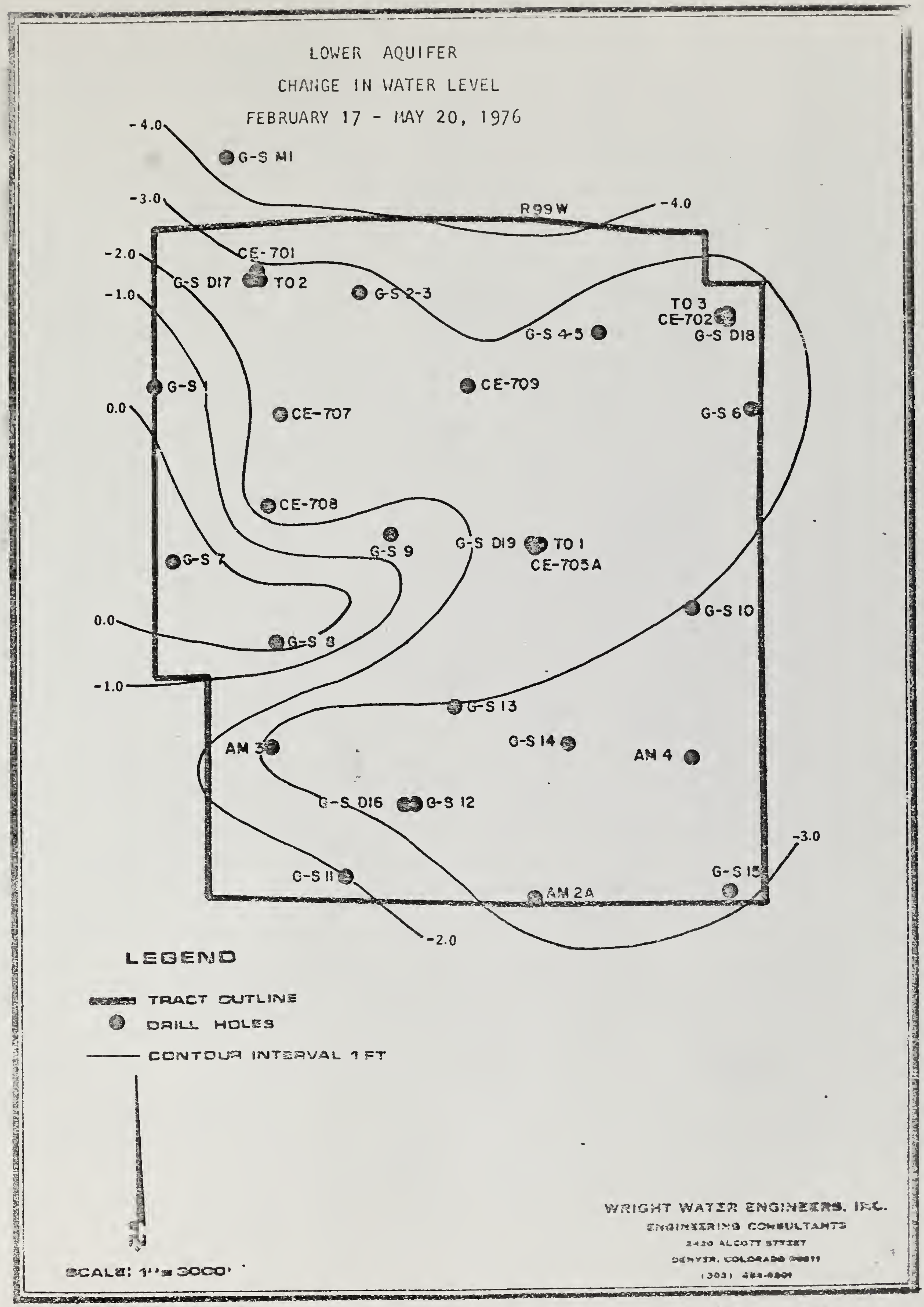

LOWER AQUIFER
CHANGE IN WATER LEVEL
FEBRUARY 17 - MAY 20, 1976

Figure 1.2-47

1.2.8 Hydrologic Program Summary

The following is a summary of the hydrologic studies related to Tract C-a development during the quarter from March to May, 1976. The summary covers three main categories: surface water, alluvial aquifers and deep aquifers.

1.2.8.1 Surface Water

Perennial streams or streams that have perennial reaches recorded flows are Corral Gulch east of Tract C-a, Corral Gulch south of 84 Mesa, and Yellow Creek near White River. In addition to these perennial flows, six surface water gaging stations recorded a short duration of stream discharge in February and March, 1976. These stations are located at Box Elder Gulch near the west boundary of Tract C-a, "Rinky-Dink" Gulch near the east boundary of the tract, Stake Springs Draw near Confluence with Corral Gulch, Tributary to Yellow Creek east of 84 Mesa, Upper and Lower Big Duck Creek north of 84 Mesa. Major flows at these stations occurred three times during February and March. Apparently they were associated with snow melt runoff as evidenced by the correlation between the stations with unseasonably high air temperatures.

The three gaging stations located along the perennial reaches of the streams generally showed increased flows during the period of February through mid-April. The peak flows during this period were associated with spring snow melt runoff. Generally, the mean conductivity data fluctuated about the 1975 water year average. The mean conductivity for the Yellow Creek surface water gaging station located near the White River did show a low value of approximately 1200 umhos/cm. The lowest value recorded at this gaging station is 1170 umhos/cm on May 2, 1975. The continuous temperature data recorded at the three gaging stations indicated a general rise in temperature during the period of February through mid-April, 1976. This temperature rise generally follows a rise in seasonal ambient temperature. The boron and fluoride concentrations stayed at about the same levels as the average values recorded during the first year of baseline data.

The chemical constituents reported in Tables 1.2-3 through 1.2-12 were within the limits set during water year 1975. It should be noted that the first and only water samples to be reported to date from Rinky-Dink Gulch near the east line of Tract C-a, Stake Springs Draw near the confluence with Corral Gulch, Upper Big Duck Creek north of 84 Mesa, and the Tributary to Yellow Creek east of 84 Mesa, are reported in this quarterly report.

Generally, precipitation events were regional in nature. Widespread rain showers occurred several times in early March and mid-April. Recording type rain gage data indicated that March and April were the two wettest months during January through late May, 1976. Average monthly precipitation was 1.33 inches for these two months as indicated by the three recording precipitation stations.

The three storage precipitation gages were shut down during the winter months. During the month of April, the average precipitation recorded at these three stations was 0.94 inches. This value compares very favorably with the 0.93 inches of precipitation recorded at the recording gaging station located at the Stake Springs Draw surface water gaging station.

1.2.8.2 Alluvial Aquifers

The alluvial aquifer monitoring program which began in April, 1975, has not discovered any new alluvial holes to contain water since they were drilled. The alluvial holes which have encountered water are: G-S S-7, G-S S-8, G-S S-11, G-S S-12, G-S S-19, G-S S-22, G-S S-23, and G-S S-24. The water levels in these alluvial holes rose an average of 0.6 of a foot during this quarterly period. This rise in water level, which began in April of 1976, is apparently due to the spring snow melt runoff.

The specific conductance of the water from the alluvial aquifer monitor holes measured in the field was within the range of values recorded in 1975. The water temperatures ranged from 7.5^{o}C to 10.5^{o}C. Their trend was increasing at the time the last samples were collected. The pH values remained relatively stable, between 6.0 and 6.5.

The chemical constituents analyzed from the alluvial aquifer water samples are summarized in Tables 1.2-15 and 1.2-16. A computer printout of each of the alluvial hole water sample analysis is found in the raw data volume of this report. The values for the individual constituents were within the limits established during 1975.

1.2.8.3 Deep Aquifer Monitoring

During the quarterly period, samples were collected from the deep aquifer monitor holes. It should be noted that samples were not taken from G-S 8, which is a lower aquifer monitor hole, G-S 10, the upper and lower aquifers, and G-S M-4, the upper and lower aquifers. The reason samples could not be taken from these holes were due to a breakdown in the equipment. Samples will be collected during the next quarterly period.

Water levels in the deep monitor holes were monitored monthly. The results of this monthly water level monitoring are shown on Tables 1.2-19 and 1.2-20 for the upper and lower aquifers respectively. Shown on Figures 1.2-44 and 1.2-45 are the piezometric levels for the upper and lower aquifers on May 20, 1976.

Upper aquifer piezometric levels are generally increasing over the tract. The rate of increase varies. Across the south side of the tract, piezometric levels increased at about 0.33 feet to 1 foot per month. Maximum rate of 1.33 feet per month was observed near CE 708 where the increase appears to be associated with spring recharge. Water levels across the north side of the tract are either stable or slightly increased.

The lower aquifer piezometric level has been decreasing since the dual aquifer completion in all the open holes. The average rate of decrease ranged from 0.5 feet to 1.6 feet over most parts of Tract C-a. The phenomena observed in both the upper and lower aquifers are due to perennial stabilization of their initial aquifer condition.

Hydraulic connection between the upper and lower aquifers appears to be present in the northeast section of the tract as evidenced by the comparable water quality in the dual aquifer monitoring holes.

In the upper aquifer, conductivity ranged from 1000 to 1400 umhos/cm over most of the tract. In the lower aquifer, relatively better quality water was found near the west side of the tract.

In general, conductivity in the lower aquifer had decreased as the samples collected in March, 1976 were compared to those collected in July, 1975. The decrease ranged from a minimum of 50 umhos/cm in the northern boundary of Tract C-a to a maximum of 2000 umhos/cm noted at G-S 11 and G-S 12.